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## ILLUSTRATIONS OF FUNGI—XXII

WILLIAM A. MURRILL

The accompanying figures were all drawn from specimens collected near Bronx Park, New York City. Many of the species figured are known to be edible. Dr. Kauffman has assisted me with *Cortinarius* and Dr. Burlingham with *Russula*.

### *Cortinarius roseipallidus* sp. nov.

PALE-ROSY CORTINARIUS

Plate 163. Figure 1.  $\times 1$

Pileus convex, becoming plane, solitary, about 7 cm. broad; surface smooth, hygrophanous, fibrillose-striatulate, rosy-isabelline, margin entire, pallid; context pale-rosy-isabelline, very thin; lamellae deeply sinuate, rounded behind, very broad, subdistant, fulvous; spores ellipsoid, smooth, subfulvous,  $9-10 \times 6 \mu$ ; stipe cylindric, rosy-isabelline, decorated with the remains of the fugacious veil, hollow, scarcely enlarged at the base, 5-7 cm. long, 1-1.5 cm. thick.

Type collected on the ground in deciduous woods east of the New York Botanical Garden, September 10, 1911, by W. A. Murrill. The pileus and stipe, as well as the context, are rosy-isabelline, or about the color of the back of a man's hand. This color is mostly concealed on the pileus by the hygrophanous character of the surface, but it is evident on the margin.

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**Melanoleuca Russula** (Scop.) Murrill*Tricholoma Russula* Gill.**REDDISH MELANOLEUCA**Plate 163. Figure 2.  $\times 1$ 

Pileus fleshy, convex, becoming plane or centrally depressed, obtuse, solitary or subcespitoso, 7.5-12.5 cm. broad; surface viscid when moist, smooth or dotted with granular squamules on the disk, pale-pink or rose-red suffused at times with yellowish stains, margin usually paler, involute and minutely downy in the young plant; context white, sometimes tinged with red, the taste mild; lamellae subdistant, rounded behind or subdecurrent, white, often becoming red-spotted with age; spores ellipsoid,  $6-7.5 \times 4\mu$ ; stipe solid, firm, dry, white, often reddish below, squamulose at the apex, 3-7 cm. long, 1.5-2.5 cm. thick.

This attractive plant, which resembles species of *Russula* but is firmer because the context is not vesiculose, is frequently found on the ground under oaks or in mixed woods in the northeastern United States. The specimen figured was collected near Bronx Park on August 6, 1911. I have seen other specimens with much redder surface. Peck includes the species in his list of edible mushrooms.

**Gymnopilus farinaceus** sp. nov.**MEALY GYMNOPILUS**Plate 163. Figure 3.  $\times 1$ 

Pileus convex to plane and at length upturned, solitary, 5 cm. broad; surface smooth, glabrous, somewhat hygrophanous, isabelline or pale-fulvous, fulvous on the disk; context white, thin, the taste decidedly sweet and farinaceous, the odor not characteristic; lamellae adnate to adnexed, rounded behind, very broad, subtriangular, purplish-brown, rather crowded; spores ellipsoid, smooth, ferruginous-melleous,  $4-5 \times 3-4\mu$ ; stipe cylindric, equal, except at the expanded base, smooth, dry, glabrous, straw-colored, hollow, about 5 cm. long and 8 mm. thick.

Type collected on the ground in deciduous woods east of the New York Botanical Garden, September 10, 1911, by W. A. Murrill. The species seems near *Gymnopilus spumosus*. The pur-

pish-brown color of the lamellae should be noted, as well as the decidedly sweet, farinaceous taste of the context.

**Cortinarius erythrinus Fries**

BAY CORTINARIUS. UMBONATE CORTINARIUS

Plate 163. Figure 4.  $\times 1$

Pileus convex to expanded, becoming depressed about the conspicuous conic umbo, gregarious, reaching 3.5 cm. broad; surface smooth, polished, fuliginous; context extremely thin, dirty-whitish; lamellae slightly sinuate, very broad, crowded, fulvous; spores ellipsoid, smooth, fulvous,  $8-9.5 \times 4.5-5 \mu$ ; stipe slender, equal, grayish-white, solid, decorated with the fibrillose remains of the arachnoid, fugacious veil, about 3 cm. long and 3 mm. thick.

This species is well distinguished among the members of the genus *Cortinarius* in this region by its small size, prominent umbo, and dark-bay color, which often changes to blackish on drying. The specimens here figured were collected on the ground in deciduous woods east of the New York Botanical Garden, September 17, 1911.

**Cortinarius anomalous Fries**

ANOMALOUS CORTINARIUS

Plate 163. Figure 5.  $\times 1$

Pileus convex, not expanding, solitary or gregarious, 5-10 cm. broad; surface smooth, dry, subglabrous, pallid, tinged with dark-ochroleucous; context white, thick at the center and very thin at the edges; lamellae sinuate, broad, subcrowded, subfulvous; spores subglobose to ellipsoid, smooth, pale-ferruginous,  $6-9 \times 6-6.5 \mu$ ; stipe subconcolorous, almost white, enlarged at the base, solid, crooked, white within except at the base, smooth, dry, slightly fibrillose from the remains of the fugacious veil, about 5-6 cm. long and 7 mm. thick.

Collected in deciduous woods near Bronx Park, New York City, September 10, 1911. The plant suggests *Hebeloma* or *Flammula*. Those having access to exsiccati will find this species illustrated with excellent specimens prepared by Herpell. It is reported by the older mycologists from New England to North Carolina and west as far as Minnesota.

***Russula crustosa* Peck****CRUSTED RUSSULA**Plate 163. Figure 6.  $\times 1$ 

Pileus convex, becoming nearly plane or centrally depressed, 5–12 cm. broad; surface variable in color, stramineous, pale-ochraceous, brownish-ochraceous, greenish or greenish-yellow, rarely brownish-purple, usually dry, viscid when wet, with small, appressed, areolate scales, except on the smooth disk; margin striate when mature; context white, mild or slightly and tardily acrid; lamellae white, some short, some forked, narrowed toward the stipe, moderately close; spores white, subglobose,  $8-10\ \mu$ ; stipe white, equal, stuffed or hollow, 3–6 cm. long, 1.2–2.5 cm. thick.

This easily recognized species occurs rather commonly in mid-summer in woods or wood borders from Connecticut west to Michigan and south to Alabama and Mississippi. The specimen figured was collected near Bronx Park in August, 1911, and the taste was perfectly mild and agreeable. It is, however, sometimes slightly acrid when raw, but of excellent flavor when cooked. *Russula virescens*, a closely related species, is also edible.

***Russula bifida* (Bull.) Schröt.*****Russula furcata* (Lam.) Fries****FORKED RUSSULA**Plate 163. Figure 7.  $\times 1$ 

Pileus convex, becoming plane or concave, gregarious, 6–11 cm. broad; surface flavovirens, olivaceous, or some other shade of green tinged with fulvous or black on the disk, smooth or at times roughened with fine marks presenting a tomentose appearance which is deceiving; margin even, inflexed, the pellicle separable on the margin only; context white, mild in taste; lamellae white, forking twice or sometimes three times, adnate to slightly decurrent, rather broad, crowded to subdistant; spores globose, echinulate, hyaline,  $7-9\ \mu$ ; stipe white, tapering downward, solid, becoming spongy or hollow with age, smooth, 3–7 cm. long, 1–2 cm. thick.

This large and attractive species occurs rather commonly in the edges of oak woods about New York City during July and August.

I have always found it mild in flavor and therefore presumably edible, although a French chart includes it among the dangerous species. It should be thoroughly tested and carefully compared with related species before being used for food. Its large size, firmness, and comparative freedom from insect attack would make it desirable if perfectly harmless. Few species of *Russula* have these qualities, which are so important when considering mushrooms for food.

**Lactaria Hibbardae Peck**

HIBBARD'S LACTARIA

Plate 163. Figure 8.  $\times 1$

Pileus rather thin, broadly convex or nearly plane, slightly depressed, solitary or gregarious, 4-6 cm. broad; surface dry, fuscous, concentrically zonate, subglabrous; context very thin, firm, white; latex white, unchanging, decidedly acrid at once; lamellae adnate, rather narrow, subdistant, cream-colored; spores globose, roughly echinulate, hyaline,  $7-9\mu$ ; stipe equal, cylindric, smooth, glabrous, concolorous, about 3.5 cm. long and 1 cm. thick.

This species has been found a few times in Massachusetts and Vermont on the ground under coniferous trees, and I have collected it twice in the New York Botanical Garden under deciduous trees. In one case, the plants grew in considerable number on a lawn beneath a clump of oaks and maples. The authentic specimens of *L. Hibbardae* which I have seen appear to represent young stages only, and these agree perfectly with the young stages in my own collections. Some mycologists might possibly consider *L. Hibbardae* a small fumose variety of the common *L. ligniota*, but the color is decidedly distinct and shows no tendency to vary. The latex is white and acrid at once, but not so violent as that of *L. piperata*, for example.

**Clavaria fusiformis Sow.**

FUSIFORM CLAVARIA

Plate 163. Figure 9.  $\times 1$

Hymenophore densely clustered; clubs fusoid, rarely nearly cylindric, attenuate both at the apex and at the base, nearly erect,

simple, rather brittle but firm, soon hollow, smooth, glabrous, ochraceous to luteous, becoming somewhat darker at the apex with age; spores copious, ovoid, smooth, hyaline,  $7-9 \times 5.5-6.5 \mu$ .

This pretty, yellow species grows in attractive clumps by roadsides in woods throughout the eastern United States and Europe. The plant is edible, with an excellent flavor, but is rarely found in sufficient quantity for food. The specimens figured are smaller than those usually seen.

**Pholiota Johnsoniana** (Peck) Sacc.

JOHNSON'S PHOLIOTA

Plate 163. Figure 10.  $\times 1$

Pileus soft, fleshy, convex to plane, gregarious, 6-8 cm. or more broad; surface smooth, moist, stramineous or cremeous to melleous-ochraceous, usually glabrous, rarely slightly squamulose, margin thin, pallid, striatulate at times when moist; context white, thick at the center, readily devoured by insects, the taste mild but not pleasant; lamellae adnate to adnexed, close, rather narrow, pale-purplish, becoming more fulvous as the spores mature; spores ovoid or ellipsoid, smooth, fulvous,  $4.5 \times 3.5 \mu$ ; stipe equal, cylindric, white to straw-yellow, solid, slightly striate at the apex, often floccose-scaly below the annulus, 5-12 cm. long, about 1 cm. thick; annulus median or situated slightly above the middle, thick, white, sometimes stellate below when young, persistent but rather easily broken.

Peck described and figured this species in 1872 from specimens collected by Hon. A. S. Johnson at Knowersville, New York, in September. Atkinson found it at Blowing Rock, North Carolina, and photographed some rather large specimens of it. I have collected it in the New York Botanical Garden several times in considerable quantity and Earle got it at Mt. Vernon, New York, a few miles north of here. The species appears in September or October, usually in woods or wood borders, and always on rich soil. It has somewhat the appearance of *Stropharia bilamellata*, but the lamellae, although purplish when young, are much lighter at maturity than in that species. The annulus is thick and sometimes stellate below in the young stages as in *Agaricus arvensis*.

NEW YORK BOTANICAL GARDEN.

## UREDINALES OF PORTO RICO BASED ON COLLECTIONS BY F. L. STEVENS<sup>1</sup>

J. C. ARTHUR

(Continued from page 196)

36. *UROMYCES PIANHYENSIS* P. Henn. *Hedwigia* 47: 266. 1908.

ON *CARDUACEAE*:

*Wedelia reticulata* DC., San German, Dec. 8, II, 4697.

Although only uredinia are available in the Porto Rican material, yet they agree so exactly with the species described by Hennings from Brazil that no question of identity can be entertained. The type collection was made by E. Ule 3329, in January, 1907, on an undetermined species of *Wedelia*. The portion of the leaf of the type collection, which has been examined, shows the same peculiar hairs along the veins, and in general has the same appearance, as the Stevens' collection, except that it is of a less firm texture, indicating a close relationship if not identity of host species.

The urediniospores may be described as globoid, or often triangular-obovoid, 18-21  $\mu$  in diameter, the light chestnut-brown wall closely and finely echinulate, thin, 1.5  $\mu$  or less thick, with pores indistinct, but probably 2 and equatorial.

37. *Puccinia Cameliae* (Mayor) comb. nov.

*Uredo Cameliae* Mayor, Mem. Soc. Neuchat. Sci. 5: 578.  
1913.

ON *POACEAE*:

*Chaetochloa setosa* (Sw.) Scribn. (*Setaria setosa* Beauv.),  
Mona Island, Dec. 20, 21, 6118.

This collection shows both uredinia and telia. The species, showing only uredinia, was detected on a phanerogamic specimen in the herbarium of the New York Botanical Garden on

<sup>1</sup> Continued from *Mycologia* 7: 196. 1915.

*C. scandens* (Schrad.) Scribn. (*S. scandens* Schrad.) collected by Brisbane in Jamaica, Oct., 1896. Both the host of the latter specimen and that of the type of Mayor's *Uredo Cameliae* have been examined by Prof. A. S. Hitchcock, and the two pronounced identical.

Mayor's type collection was made at Camelia, a coffee plantation near Angelopolis, U. S. of Colombia. It has been possible, through the kindness of Prof. E. W. D. Holway, to examine some of the type collection. Most unexpectedly an abundance of telia were found, although they have not been mentioned by the author of the species. It is possible that they were overlooked, because they form small, inconspicuous sori, with spores so firmly pressed together, that the usual method of examination by scraping generally fails to discover them. They need to be studied by sectioning the leaf.

It is possible from type material to supply the following diagnosis:

Uredinia amphigenous, scattered, elliptical, small, 0.5 mm. long, rather tardily naked, cinnamon-brown; urediniospores ellipsoid, 15-21 by 19-28  $\mu$ ; wall pale yellow to nearly colorless, thin, about 1  $\mu$ , closely and very finely echinulate, the pores obscure, 6-8, scattered.

Telia amphigenous, scattered, oblong or linear, 0.3-0.5 mm. long, blackish brown, long covered by the epidermis; teliospores firmly compacted together, oblong to cylindrical, small, 10-16 by 32-39  $\mu$ , truncate or rounded at both ends, or sometimes narrowed below, slightly or not constricted at the septum; wall chestnut-brown, thin, about 1  $\mu$ , darker and somewhat thicker above, 3-5  $\mu$ ; pedicel very short, usually not seen.

38. PUCCINIA CENCHRI Diet. & Holw. Bot. Gaz. 24: 28. 1897.

ON POACEAE:

*Cenchrus echinatus* L., Guanica, Feb. 3, 339; Mona Island, Dec. 20, 21, 6277.

*Cenchrus viridis* Spreng., Guanica, Feb. 1, 351; Guayama, Dec. 4, 5338.

The host of the collection from Mona Island was first pronounced by Prof. A. S. Hitchcock to be *C. viridis*. Upon learning from Dr. N. L. Britton that this host was not known from

Mona Island, although a specially thorough phanerogamic survey of the island has been made, the scanty material submitted by Dr. Stevens was gone over by Dr. Britton and Mr. Nash of the New York Botanical Garden, and again reviewed by Prof. Hitchcock. Prof. Hitchcock writes, Feb. 18, 1915: "I have reexamined it, and from the specimen itself I am inclined to think it may be *Cenchrus viridis*, but from the evidence which you present and the fragmentary condition of the specimen I think it best to let it stand as *Cenchrus echinatus*. The two species are closely allied, and one could not state with certainty from the fragmentary material that the specimen might not be a small fruited form of *Cenchrus echinatus*."

The species has also been found in Cuba and in Bahamas on *C. echinatus*, by E. W. D. Holway.

39. PUCCINIA DEFORMATA Berk. & Curt. Jour. Linn. Soc. 10:  
357. 1869.

*Dicaeoma deformatum* Kuntze, Rev. Gen. 3<sup>8</sup>: 468. 1898.

ON POACEAE:

*Olyra latifolia* L., San German, Dec. 12, 5849, 5855.

The type collection was made by Charles Wright in Cuba, 1856-7. A Porto Rican collection was made by A. A. Heller at Mayagüez, Jan. 30, 1890, 4443. Both are on *O. latifolia*.

40. PUCCINIA HUBERI P. Henn. Hedwigia Beibl. 39: 76. 1900.

ON POACEAE:

*Panicum trichoides* Sw., Villa Alba, Jan. 3, 82; Maricao, Jan. 10, 194; Nov. 18, 4810; Adjuntas, Nov. 22, 4973; Jayuya, Dec. 17, 5981; all show uredinia only.

The only other Porto Rican collection seen is one by G. P. Clinton on the same host, obtained at La Carmelita, April, 1904.

The species was established on a collection by Dr. J. Huber on *Panicum ovalifolium* obtained in the Botanical Garden of Para, Brazil. It has not yet come to light in North America outside of Porto Rico.

41. PUCCINIA LEVIS (Sacc. & Bizz.) Magn. Ber. Deut. Bot. Ges. 9: 190. 1891.

*Diorchidium leve* Sacc. & Bizz. *Michelia* 2: 648. 1882.  
*Puccinia Paspali* Tracy & Earle, *Bull. Torrey Club* 22: 174. 1895.

*Dicaeoma Paspali* Arth. *Result. Sci. Congr. Bot. Vienne* 344. 1906.

ON POACEAE:

*Paspalum plicatulum* Michx., *Vega Baja*, Feb. 20, II, 490.

*Ryttilix granularis* (L.) Skeels (*Manisuris granularis* Sw.), *Rosario*, Jan., 1914, 4835.

No other collections are known from Porto Rico, but it was found in Antigua on *P. fimbriatum*, by J. N. Rose 3410. Dr. P. Sydow kindly sent me material from his herbarium representing collections in *R. granularis* from Guadeloupe and Martinique.

A collection of the rust on *P. pilosum* Lam. was obtained by Dr. Stevens at Caracas, Venezuela. It is a rather common rust in South America, and extends into North America as far as Texas and Louisiana. The type of the species was from Brazil on *Manisuris granularis*. A careful comparative study of the North American rust on *Paspalum*, called *P. Paspali* by Tracy and Earle, shows the two forms to be identical.

42. PUCCINIA SUBSTRIATA Ellis & Barth. *Erythea* 5: 47. 1897.

*Uredo Chaetochloae* Arth. *Bull. Torrey Club* 33: 518. 1906.

*Puccinia Chaetochloae* Arth. *Bull. Torrey Club* 34: 585. 1907.

ON POACEAE:

*Paspalum Helleri* Nash, *Vega Baja*, May 21, 1732.

*Paspalum orbiculatum* Poir., *Monte de Oro*, Dec. 3, 5721.

*Paspalum paniculatum* L., *Mayagüez*, Jan. 30, 293; April 28, 898; *Monte Alegrillo*, Nov. 14, 4758.

The species was collected at Bayamon by E. W. D. Holway, Jan., 1911, on *P. Schreberianum* (Flügge) Nash, showing only uredinia.

Another West Indian collection was obtained by E. W. D. Holway in Cuba, March, 1903, on *Chaetochloa verticillata* (L.) Scribn. (*Setaria verticillata* Beauv.). A search in the phanero-

gamic herbarium at the N. Y. Bot. Garden revealed the following: from Cuba, on *C. imberbis* (Poir.) Scribn., J. A. Shafer 11795, A. E. Jennings 154, on *C. onurus* (Griseb.) S. & M., Norman Taylor 232, Britton & Wilson 29, on *C. setosa* (Sw.) Scribn., Rugel 880; from Jamaica on *C. purpurascens* (H.B.K.) S. & M., N. L. Britton 1659; and from Bermuda on *C. brevispica* S. & M., Stewardson Brown 116, 302.

43. PUCCINIA CANALICULATA (Schw.) Lagerh. *Tromsö Mus. Aarsh.* 17: 51. 1894.

*Sphaeria canaliculata* Schw. *Trans. Am. Phil. Soc.* II, 4: 209. 1832.

*Puccinia Cyperi* Arth. *Bot. Gaz.* 16: 266. 1891.

*Uredo Kyllingiae* P. Henn. *Hedwigia* 35: 256. 1896.

*Dicaeoma canaliculatum* Kuntze. *Rev. Gen.* 3<sup>8</sup>: 466. 1898.

ON CYPERACEAE:

*Cyperus laevigatus* L., Guanica, Feb. 3, 349.

*Cyperus radiatus* Rottb., Mayagüez, Dec. 24, 1912, 147, May 3, 1160.

*Cyperus* sp., Villa Alba, Jan. 3, 114.

The species has also been collected in Porto Rico on *C. cayennensis* (Lam.) Britt., at Mayagüez, by G. P. Clinton, April, 1904; on *C. sphacelatus* Rottb., at Mayagüez and La Carmelita, both by G. P. Clinton, April, 1904; on *C. polystachys* Rottb., at Cataruo, by A. A. Heller, May, 1899; and on *C. surinamensis* Rottb., at Añasco, by A. A. Heller, Feb., 1900. It was also found on a phanerogamic specimen of *Kyllinga pumila* Michx. (*K. caespitosa* Nees), in the phanerogamic herbarium at the New York Botanical Garden, collected by J. A. Stevenson, at Rio Piedras, Feb., 1914, 1274, and on one collected by J. A. Shafer at Loma Icaco, July, 1914, 3452.

Collections have also been made in Jamaica by L. M. Underwood, on *C. mutisii* H.B.K., Feb., 1903, 1526, and by N. L. Britton, Sept., 1906, 14; and it was detected on a phanerogamic specimen of *Kyllinga pumila* from Martinique, collected by Père Duss, Aug., 1903, 4714.

44. PUCCINIA ELEOCHARIDIS Arth. Bull. Iowa State College 156.  
1884.

*Aecidium compositorum Eupatorii* DeT.; Saccardo, Syll. Fung.  
7: 798. 1888.

*Dicaeoma Eleocharidis* Kuntze, Rev. Gen. 3<sup>3</sup>: 468. 1898.

ON CYPERACEAE:

*Eleocharis cellulosa* Torr., Santurce, May 21, 1792.

*Eleocharis geniculata* (L.) R. Br., Mayagüez, March 9,  
484, 489.

*Eleocharis interstincta* (Vahl) R. & S., Mayagüez, March  
21, 416.

*Eleocharis* sp., Cataño, Nov. 3, 4530.

Porto Rican specimens of this rust have also been collected at Mayagüez, Feb., 1900, by A. A. Heller 4539, and April, 1904, by G. P. Clinton, and also at Rio Piedras, Feb., 1912, by J. R. Johnston 201. No other West Indian collections have been seen. All the collections cited show urediniospores only.

45. PUCCINIA FIMBRISTYLIDIS Arth. Bull. Torrey Club 33: 28.  
1906.

ON CYPERACEAE:

*Fimbristylis diphylla* Vahl, Ponce, Nov. 8, 4381.

*Fimbristylis ferruginea* (L.) Vahl, Joyuda, March 31,  
963; Santurce, May 21, 1874.

It has been collected on *Fimbristylis* sp., at Mayagüez, P. R., April, 1904, by G. P. Clinton, and on *F. diphylla*, at Asolen, Martinique, August 4, 1913, by Dr. F. L. Stevens 2970. No other West Indian collections have been seen. All the collections here mentioned show only uredinia.

46. *Puccinia sclericicola* sp. nov.

Uredinia amphigenous, scattered, oval or oblong, small, 0.3–0.6 mm. long, rather tardily naked, cinnamon-brown, somewhat pulverulent, ruptured epidermis conspicuous; urediniospores broadly ellipsoid or obovoid, 15–22 by 19–26  $\mu$ ; wall dark yellow, about 1.5  $\mu$  thick, finely and moderately echinulate, the pores 4, or sometimes 3, equatorial.

Telia chiefly hypophyllous, scattered, oval or oblong, small, 0.3-0.4 mm. long, tardily naked, blackish-brown; teliospores oblong or clavate-oblong, 15-19 by 29-42  $\mu$ , slightly constricted at the septum, truncate, oblique, or often rounded above, usually somewhat narrowed below; wall cinnamon-brown, 1.5-2  $\mu$  thick, usually thicker above, 3-6  $\mu$ , smooth; pedicel tinted, short.

ON CYPERACEAE:

*Scleria* sp., Preston's ranch near Naguabo, Dec. 31, II, 6684.

It also occurs on specimens in the phanerogamic collection of the New York Botanical Garden on *Scleria hirtella* Sw., collected at Markin Pena, P. R., June, 1913, II, by J. R. Johnston 843, and on *S. verticillata* Muhl., collected in Isle of Pines, Cuba, Dec., 1903, III, by A. H. Curtiss.

A number of localities are now known for the species in the United States. A collection was made on *S. hirtella*, at the edge of Long Prairie Hammock, on Camp Longview Trail, about forty miles southwest of Miami, Fla., Oct. 31, 1906, II and III, by Ernst A. Bessey. The following data have been secured from phanerogamic collections: in the Purdue University herbarium, on *S. Baldwinia* Torr., Everglades, Fla., June, 1877, II, A. P. Garber; N. Y. Bot. Garden herbarium, on *S. Baldwinia*, Everglades, Fla., March, 1892, II, J. H. Simpson 556, on *S. pauciflora* Michx., Sumter Co., Ga., July, 1901, II, Roland M. Harper 1036, on *S. setacea* Poir., Lee Co., Fla., July-August, 1900, II, A. S. Hitchcock 428, Braidentown, Fla., Nov. 15, 1900, II and III, S. M. Tracy, on *S. verticillata* Muhl., Everglades, between Cutler and Longview Camp, Fla., Nov. 9-12, 1903, II and III, J. K. Small and J. J. Carter. This last collection is taken as the type of the species.

This species has much darker colored and thicker-walled urediniospores than *Rostrupia Scleriae* Paz., or *Puccinia xanthopoda* Syd. It also differs in its urediniospores from *Uromyces Scleriae* P. Henn., the latter having spores strongly thickened above.

47. *Puccinia Cannae* (Wint.) P. Henn. *Hedwigia*

41: 105. 1902.

*Uredo Cannae* Wint. *Hedwigia* 23: 172. 1884.

*Puccinia Thaliae* Dietel, *Hedwigia* 38: 250. 1899.

## ON CANNACEAE:

*Canna coccinea* Ait. (*C. portoricensis* Bouché), Mamayes,

May 21, 1912, II, 9.

*Canna glauca* L., Cabo Rojo, Oct. 24, 1912, II, III, 169c,  
Oct. 30, 1912, II, 169.

*Canna* sp., Rio Piedras, June 2, 1912, II, 16; Santurce,  
Jan. 3, 1912, II, 33; Corozal, Feb. 21, II, 405; Mayagüez,  
April, 1912, II, III, 4c, April 30, II, 983; Añasco, Oct.  
19, 3595, II, 3603; Rosario, Nov. 14, II, 4834; without  
locality or date, II, 157.

## ON MARANTACEAE:

*Thalia geniculata* L., Añasco, July 28, 1912, II, 66; Maya-  
güez, July 29, 1912, II and III, 66c.

The rust has also been collected on one of the two species of wild *Canna* known in Porto Rico by G. P. Clinton at Mayagüez, April 11, 1904, and on cultivated *Canna* at San Juan, April 8, 1904, and by J. A. Stevenson on Trujillo Alto road Nov., 1914, 2338. It was also gathered on cultivated *Canna* at San Juan, by E. W. D. Holway, Jan., 1911. It was collected at Mayagüez, April, 1904, by G. P. Clinton on *Thalia geniculata*.

From other islands specimens have been seen collected by F. S. Earle in Jamaica on cultivated *Canna*, Oct.-Nov., 1902, 56, and by both Mel. T. Cook, July 10, 1906, and C. F. Baker, July 2, 1906, in Cuba, on *Canna indica*. The last collection is issued in Sydow, Uredineen 2114, and Bartholomew, Fungi Columbiani 2387.

As usual with tropical rusts, the telia of this species are not abundantly produced. In the Stevens' set only four of the fourteen collections show telia. The telia, however, are in normal development. The collections of April and October, 1912, on *Canna*, were sent to Lafayette with the hope that they might be used in cultural work, but the teliospores could not be brought to germination, although every condition seemed favorable.

In comparing the collections on *Canna* and *Thalia*, there being two of each with both uredinia and telia, no difference could be found in the microscopic appearance of the fungus on the two hosts. The two hosts have essentially the same texture and structure of leaf. In both there is an epidermal layer of small,

rectangular cells, augmented by a hypodermal layer of very large, rectangular cells, the cells in both instances having uniformly thin, but firm walls. The sori are situated below the hypodermal layer, often directly beneath a stoma. The resistance of the overlying tissue evidently accounts for the angular and irregular spores of both uredinia and telia.

The habitat for both *Canua* and *Thalia* is the same, and their manner of growth is similar. The two genera belong to closely related families, with many important characters in common. There are now many species of rusts known to go to more than one family of hosts. There seems no longer any good reason, either in the nature of the fungus or in the matter of convenience, for maintaining two specific names, and they are herewith united.

48. PUCCINIA MACROPODA Speg. An. Soc. Ci. Arg. 10: 8. 1880.

*Uredo striolata* Speg. An. Soc. Ci. Arg. 9: 173. 1880.

ON AMARANTACEAE:

*Iresine elatior* L. C. Rich., Desechoe, May 31, II, 1613.

The same rust in its characteristic uredinial stage was collected on the same host on the island of St. Thomas, May, 1906, by C. Raunkiaer, and on *Iresine paniculata* (L.) Kuntze in Cuba, March, 1903, by E. W. D. Holway.

49. PUCCINIA RIVINAE (Berk. & Curt.) Speg. An. Mus.

Buenos Aires 19: 304. 1909.

*Accidium Rivinae* Berk. & Curt. Jour. Linn. Soc. 10: 358. 1869.

*Endophyllum Rivinae* Arth. N. Am. Flora 7: 126. 1907.

*Puccinia Raunkiacrii* Ferd. & Winge, Bot. Tidsskr. 29: 8. 1908.

ON PETIVERIACEAE (PHYTOLACCACEAE):

*Rivina humilis* L., Desechoe, May 31, I, II, 1590.

Collections on the same host have been seen from Cuba, June, 1906, I, Mel. T. Cook, and from St. Thomas, Oct., 1906, I, II, III, C. Raunkiaer 1819, also on *R. octandra* L. from Cuba, April, 1905, I, Baker & Van Herman 4775.

50. PUCCINIA INFLATA Arth. Bull. Torrey Club **33**: 516. 1906.

ON MALPIGHIACEAE:

*Stigmaphyllo lingulatum* (Poir.) Small (*Triopteris lingulata* Poir.), Desechoe, Jan. 2, O, II, III, 131, May 31, O, II, III, 1578, 1600; Boqueron, Feb. 15, II, 328bis; Guanica, Feb. 3, II, 334; Coamo Springs, April 6, III, 818, 850; Mona Island, Dec. 20, 21, III, 6105.

This species was collected in Porto Rico on the same host by E. W. D. Holway, at Ponce, Jan., 1911.

It has been collected in Cuba on *S. periplocifolium* (Desf.) Juss. by Mr. Holway, March, 1903 (Barth. N. Am. Ured. 42), and by C. F. Baker, Oct., 1904, 3538, and on *S. Sagaeum* A. Juss. by Britton, Earle & Wilson, April, 1910, 6269.

51. PUCCINIA EUPHORBIAE P. Henn. Engler's Bot. Jahrb.  
17: 13. 1893.

ON EUPHORBIACEAE:

*Aklemia petiolaris* (Sims) Millsp. (*Euphorbia petiolaris* Sims), Mona Island, Dec. 20, 21, 6185.

The only other West Indian specimen of this species seen by the writer was collected on the same host in St. Thomas, March, 1913, by J. N. Rose 4510.

52. PUCCINIA ARECHAVELATAE Speg. An. Soc. Ci. Arg.  
12: 67. 1881.

ON SAPINDACEAE:

*Cardiospermum microspermum* H.B.K., Quebradillas, May 21, 1124; Desechoe, May 31, 1628, without locality or date, 1261.

This common tropical rust was also collected on the same host by E. W. D. Holway at San Juan, Porto Rico, Jan., 1911. It was also collected on same host by A. S. Hitchcock (labeled *C. Halicacabum*), in Jamaica, Jan., 1891, and on phanerogamic specimens now in the N. Y. Bot. Garden herbarium, by J. A. Shafer 183 in Cuba, by Percy Wilson 8409 in Bahamas, and by Rose, Fitch & Russell 3333 in Antigua. The species was also collected on *C. grandiflorum* Sw. in Jamaica by L. M. Underwood, Sept., 1906.

## 53. PUCCINIA GOUANIAE Holw. Ann. Myc. 3: 21. 1905.

## ON FRANGULACEAE (RHAMNACEAE):

*Gouania lupuloides* (L.) Urban (*G. domingensis* L.), Rosario, Feb. 16, II, iii, 322a; Yauco, Oct. 3, II, 3134; Cabo Rojo, Dec. 27, II, 6471.

*Gouania polygama* (Jacq.) Urban (*G. tomentosa* Jacq.), Mayagüez, Feb. 3, II, iii, "x," May 4, II, 1209, 1481, May 24, II, 1705; Rosario, Oct. 27, II, 3774; Lares, Nov. 22, II, 4848; Aguadilla, Nov. 25, II, 4857; San German, Dec. 12, II, iii, 5860.

The species has also been collected in Porto Rico by E. W. D. Holway at Mayagüez, Jan., 1911, on *G. lupuloides*.

The type collection was made at Gebara, Cuba, by Mr. Holway, March 1903, on *G. polygama* (Barth. N. Am. Ured. 544). A collection made in Cuba by Charles Wright in 1856-7, represented in the Curtis Herbarium at Harvard University under the name "*Uredo gemmata* Berk & Curt.," belongs here. The host of this collection has recently been determined at the N. Y. Bot. Garden as *G. polygama*. Only uredinia are shown on it. I can not find that the name has been published. It is quite distinct from the collection in the same herbarium labeled "*Uredo gemmata* B. & C. var.," which belongs to *Uromyces gemmatus* Berk. & Curt. on *Jacquemontia nodiflora*. The rust occurs on a phanerogamic collection of *G. polygama* in the N. Y. Bot. Garden, collected at Herradura, Cuba, March 1907, by F. S. Earle 806.

The only other collection of this rust known to the writer from the West Indies or elsewhere is one made on *G. lupuloides* in Panama, Oct., 1899, by G. von Lagerheim, showing both uredinia and telia. The packet is marked "rarissime!"

The urediniospores in collections "x" and 4857 appear to have three pores that are superequatorial. However, it is difficult to decide with certainty regarding the position of pores in but a small percentage of the spores of a mount, and it is impossible to say that this character is really distinctive. There appear to be no other characters, except possibly that the teliospores of "x" are somewhat larger than in 322a and 5860, which would separate these collections morphologically. The pore condition may eventually prove to be a variable character or possibly a racial character.

*Puccinia gouaniicola* Speg., on *Gouania latifolia* from Argentina, has teliospores of somewhat similar shape and size but with clear golden-yellow walls, and fragile pedicels. The sori are large and cushion-shaped, and unaccompanied by urediniospores. The species appears to be a leptopuccinia, and not yet represented in North America. I am indebted to Dr. Spegazzini for a portion of the type collection of *P. gouaniicola*.

54. PUCCINIA HETEROSPORA Berk. & Curt. Jour. Linn. Soc.  
10: 356. 1869.

*Uromyces pulcherrimus* Berk. & Curt. Grevillea 3: 56. 1874.

*Uromyces Thwaitesii* Berk. & Br. Jour. Linn. Soc. 14: 130.  
1875.

*Uromyces Sidae* Thüm. Rev. Mycol. 1: 10. 1879.

*Uromyces pictus* Thüm. Rev. Mycol. 1: 10. 1879.

*Uromyces malvaccarum* Speg. An. Soc. Ci. Arg. 12: 71. 1881.

*Puccinia Thwaitesii* Winter, Hedwigia 22: 130. 1883.

*Uromyces malvicola* Speg. An. Soc. Ci. Arg. 17: 94. 1884.

*Dicaeoma pulcherrimum* Kuntze, Rev. Gen. 3<sup>3</sup>: 467. 1898.

#### ON MALVACEAE:

*Abutilon hirtum* (Lam.) Sweet., Guanica, Feb. 3, 330,  
Feb. 10, 343.

*Sida glutinosa* Comm. (*S. nervosa* DC.), Villa Alba, Jan.  
3, 106.

*Sida humilis* Cav., Boqueron, Feb. 15, 330bis.

*Sida procumbens* Sw., Guanica, Feb. 3, 322; Desecheo.  
May 31, 1583.

*Sida spinosa* L., Guayama, Dec. 4, 533I.

*Sida urens* L., Guayamilla, Nov. 13, 5870; Coamo Springs,  
Jan. 1, 59; Vega Baja, Feb. 22, 383; Yauco, Oct. 3,  
3133, 3249; Maricao, Oct. 8, 3449; Rosario, Oct. 27,  
3790, 3835, Nov. 14, 4846; Vega Alto, Nov. 19, 4745;  
Ponce, Nov. 8, 4274; Mayagüez, Nov. 13, 4716a, Jan.  
14, 1914, 6784; Aguada, Nov. 22, 5108; El Gigante near  
Adjuntas, Dec. 15, 5821.

*Wissadula periplocifolia* (L.) Presl (*Abutilon periplo-*  
*folium* G. Don), Coamo Springs, Jan. 1, 271; Guanica,  
Feb. 3, 329.

The species was also collected at Ponce, on *Sida* sp., by E. W. D. Holway, Jan., 1911; at Vieques Island on *Sida humilis*, by J. A. Shafer, Jan., 1914, 2504A; and at Rio Piedras on *Sida urens*, by J. A. Stevenson 2453. It also occurs on a phanerogamic specimen of *Wissadula periplocifolia* in the herbarium of the N. Y. Bot. Garden, collected at Yauco by Underwood & Griggs 625, June-July, 1901.

The species, which is very common in warmer regions, is also represented in the writer's herbarium from Bahamas, Cuba, Jamaica, St. Croix, and St. Thomas.

55. PUCCINIA PSIDIÆ Wint. *Hedwigia* 23: 177. 1884.

*Uredo flavidula* Wint. *Hedwigia* 24: 260. 1885.

*Uredo Myrtacearum* Paz. *Hedwigia* 29: 159. 1890.

*Uredo Eugeniarum* P. Henn. *Hedwigia* 34: 337. 1895.

*Puccinia Jambosae* P. Henn. *Hedwigia* 41: 105. 1902.

ON MYRTACEAE:

*Jambos Jambos* (L.) Lyons (*Eugenia Jambos* L.), Consumo, April 27, II, 886, Oct. 23, 1912, II and III, 63c; Maricao, without date, II, 159, Oct. 12, II and III, 182, April 2, II, 429, April 3, II and III, 710, II, 720; Rio Maricao above Maricao, Sept. 30, II, 3626, Sept. 20, II and III, 3652; Barros, Jan. 2, II and III, 208; Villa Alba, Jan. 3, II and III, 528; Monte de Oro near Cayey, Dec. 3, II, 5719; Lajome Alto, Dec. 3, II, 5759; El Gigante near Adjuntas, Dec. 15, 6017.

*Psidium Guajava* L., Villa Alba, Jan. 3, II, 108.

The rust has also been collected at the base of El Yunque, Cuba, March, 1903, by E. W. D. Holway and by Underwood & Earle. No other North American collections are known to the writer.

The ample collections secured by Dr. Stevens have made it possible to get so good an understanding of the species and its hosts, that the synonymy can now be adjusted. Urediniospores of the five species, as named above, have been examined, and found to agree perfectly. Type material of *Uredo flavidula*, as

distributed in Rab.-Winter, *Fungi Europaei* 3312, has been studied as well as type material of *Uredo Eugeniarum*. Authenticated material of *Uredo Myrtacearum*, distributed in Sydow, Uredineen 2100, and of *Puccinia Jambosae*, have also been examined. They appear to be identical in their urediniospores, and the teliospores of the last mentioned agree exactly with those in the Stevens' collections on the same host. The original descriptions, establishing the five names above, agree in all essentials where they touch upon the same characters. There are no known species of *Uromyces* on hosts belonging to the *Myrtaceae*, and therefore a possible complication is removed.

In Sydow's Monog. Ured. 1: 437, Spegazzini's species *Uredo subneurophyla* (Anal. Soc. Ci. Agr. 17: 123. 1884), which is on a species of *Psidium* from Paraguay, is listed as a synonym of *Puccinia Psidii*. I have studied a part of the type collection of *U. subneurophyla* and find that it does not agree with this species, and in fact does not belong to the *Uredinales*, being a fungus quite unlike a rust. I have seen no material of Spegazzini's *Uredo neurophyla*, published on the preceding page of the same work. This species is said to be on leaves of *Myrtaceae*, and to greatly differ from his *U. subneurophyla*. So far as one can judge from the most inadequate description, it may well be a synonym of *P. Psidii*.

Two other species of rusts are recorded as inhabiting Myrtaceous hosts. *Puccinia sanguinolenta* P. Henn., said to be on *Myrcia*, is really on the Malpighiaceous host, *Heteropteryx*, as pointed out by Holway, N. Am. Ured. 1: 59. 1907. Material of *Puccinia Rompelii* Magn., said to be on *Myrtaceae*, proves to be a distinctive species, quite unlike the above.

##### 56. *Puccinia concrescens* Ellis & Everhart sp. nov.

*Puccinia compacta* Kunze; Bubák, Hedwigia Beibl. 42: 30. 1903. Not Berk. 1855, DeBary 1858, or Thüm. 1875.

ON ASCLEPIADACEAE:

*Asclepias curassavica* L., Vega Baja, Feb. 20, 485, March, 517; Aibonito, June 5, 2139; Manati, Nov. 25, 5310, 5311; Jajome Alto, Dec. 3, 5645.

The species was also collected in Porto Rico on the same host by Mr. and Mrs. A. A. Heller in 1899, 863, as noted below, and by E. W. D. Holway, above Comercio, Feb., 1911.

It was also found in the phanerogamic collection at the New York Botanical Garden on the same host collected by A. H. Curtiss near Nassau, Bahamas, Dec., 1902, 2, by Britton & Millsbaugh at Eight Mile Rocks, Great Bahama, Feb., 1905, 2428, and by Pollard & Palmer at Baracoa, Cuba, Jan., 1902, 11.

It was pointed out by Bubák in 1901 (Sitz, Böhm. Ges. Wiss., page 5 of separate) that the earliest use of the name, *Puccinia compacta*, was for some species quite unlike the Ranunculaceous rust, for which DeBary's name had then come into use. It appears that Kunze gave the name to a collection from Surinam, made by Weigelt in 1827. Thümen remarks in Flora (1875, p. 364) that "the fungus from Surinam is highly characteristic, and I here give a diagnosis drawn from an original specimen, as none is known to me." Thümen's diagnosis and appended comments show that the specimen he had in hand was one collected in Surinam by Weigelt on an undetermined host, which we now know to be *Dasyspora foveolata* Berk. & Curt. on *Xylopia* sp. This was the same collection that Kunze had intended to name *Puccinia gregaria*. Hennings tells us in Hedwigia (1896, p. 230) that he found a specimen in the Berlin herbarium collected by Weigelt in Surinam, 1827, bearing the name *P. gregaria* Kunze and with a Latin diagnosis appended, which he publishes. The herbarium name of *P. compacta*, given by Kunze to a collection by Weigelt in Surinam on some Asclepiadaceous plant (now known to be *Asclepias curassavica*), was first published by Bubák in 1903, accompanied with a description and figures.

In the Ellis herbarium, now at the New York Botanical Garden, is a specimen of rust from Porto Rico, inscribed *Puccinia concrescens* E. & E., accompanied by a diagnosis in Mr. Ellis' handwriting. This name, as I have previously stated (Jour. Myc. 11: 10. 1905), appears not to have been published. In the absence of a usable name, the one given by Ellis may be brought forward, and it is here presented with Ellis' description slightly modified.

Telia hypophyllous, in orbicular groups on discolored spots, pulvinate, crowded but distinct, becoming confluent at the center into a cushion-like mass 2-4 mm. across, chestnut-brown, often darker at the center of the groups and paler at the edges; teliospores oblong-elliptical; often irregular, 12-20 by 20-40  $\mu$ , rounded or obtuse at both ends, or oftener somewhat narrowed below, slightly or not constricted at septum, which is occasionally oblique; wall chestnut-brown or paler, smooth, uniformly thick, 1.5-2  $\mu$ , or slightly thicker above in some spores; pedicel as long or longer than the spore, but usually appearing short by being broken away.—On *Asclepias curassavica* L., Aibonito, Porto Rico, March 22, 1899. Mr. & Mrs. A. A. Heller 863, host no. 862.

A part of this type collection was sent to Dr. Bubák in 1903, and was pronounced by him to be identical with the Weigelt collection from Surinam. He sent in return a portion of the Weigelt collection obtained from the botanical division of the Bohemian Museum in Prag, which fully substantiated his statement.

57. PUCCINA OBLIQUA Berk. & Curt. Jour. Linn. Soc.  
10: 356. 1858.

*Puccinia Cynanchi* Lagerh. Bol. Soc. Brot. 7: 129. 1889.  
*Puccinia spherospora* Syd. & Henn. Ann. Myc. 1: 327. 1903.

ON ASCLEPIADACEAE:

*Metastelma lineare* Bello, Barros, Jan. 2, 132.

*Metastelma parviflorum* R. Br., Vega Baja, Feb. 22, 368;  
Quebradillas, Nov. 22, 5023.

Other West Indian collections have been made on *M. parviflorum* in St. Thomas, March, 1913, by J. N. Rose 4509, and on *M. Schlechtendahlii* DC. in St. Croix, Dec., 1895, by A. E. Ricksecker, and in St. Thomas, March, 1913, by J. N. Rose. The type collection for the name *P. Cynanchi* Lag. is recorded for Martinique on *M. parviflorum*, but has not been examined. The species also occurs on phanerogamic specimens in the N. Y. Bot. Garden on *Fischeria crispiflora* (Sw.) Schl. from Isle of Pines, Cuba, May, 1910, O. E. Jennings 439, and from Jamaica, Feb., 1906, A. E. Wight 150.

Through the kindness of the Director of the Kew Herbarium I have been enabled to examine a part of the type material of

*Puccinia obliqua* Berk. & Curt., collected in Cuba, by Charles Wright. The material consists of a complete leaf, the blade of which is ovate, four by eight millimeters, entire and smooth, with a petiole five millimeters long. The under surface of blade and petiole is quite evenly covered with about eighty pulvinate, prominent, brown sori. Both gross and microscopic appearance of the fungus that has of recent years been assigned to *Puccinia sphae-rospora* S. & H. agree with this specimen. The host is undoubtedly some Asclepiadaceous plant, probably a *Vincetoxicum* or *Philibertia*.

The closely related species, *Puccinia Gonolobi* Rav., has been collected in the Bahamas on *Metastelma palustre* (Pursh) Schl., Aug., 1904, E. G. Britton 396, Jan., 1903, and March, 1905, A. E. Wight, on *Philibertia clausa* (Jacq.) Vail, Feb., 1905, E. G. Britton 3423, and in Cuba on the last host, March, 1910, Britton, Earle & Wilson 6022.

58. PUCCINIA CRASSIPES Berk. & Curt. *Grevillea* 3: 54. 1874.

*Puccinia Ipomoeae* Cooke; *Lagerh. Tromsö Mus. Aarsh.* 17: 61. 1895.

ON CONVOLVULACEAE:

*Ipomoea triloba* L., Mona Island, Dec. 20, 21, 6086, 6236, 6239.

The collections show both aecia and telia in good condition, as also does a collection from Santa Ysabel, P. R., J. R. Johnston 203, Jan., 1912.

Collections have been seen also from St. Croix, on *I. triloba*, and from Cuba, on *I. acuminata* (Vahl) R. & S. (*I. cathartica* Poir.) by Earle & Wilson 1140 (Barth. *Fungi Columb.* 2456), and on *I. trichocarpa* Ell. (*I. carolina* Pursh not L.) by Britton, Earle & Wilson 4827.

59. PUCCINIA LANTANAЕ Farl. *Proc. Amer. Acad. Sci.* 18: 83. 1883.

ON VERBENACEAE:

*Lantana Camara* L., Guanica, Feb. 3, 358, Dec. 29, 6607; Lares, Nov. 22, 4926; Guayanilla, Nov. 13, 5952, Dec. 29, 6603.

*Lantana involucrata* L. (*L. odorata* L.), Boqueron, Feb. 15, 354; Arecibo, May 21, 1781; Quebradillas, Nov. 22, 5017; San German, Dec. 8, 5763; Mona Island, Dec. 20, 21, 6440; without locality, Jan. 17, 1914, 6823.

This species has not before been seen by the writer from Porto Rico. It has often been collected in other West Indian islands, however. In Cuba it was found on *L. Camara*, March, 1903, E. W. D. Holway (Barth, N. Am. Ured. 645), Sept., 1906, L. M. Underwood 3248; on *L. involucrata*, May, 1906, C. F. Baker 2869, and on a phanerogamic specimen in the N. Y. Bot. Garden on *L. trifolia* L., April, 1902, S. H. Hamilton 46. In Jamaica it was found on *L. crocea* Jacq., Sept., 1906, N. L. Britton 35, and on a phanerogamic specimen in the N. Y. Bot. Garden on *L. stricta* Sw., Sept., 1906, N. L. Britton 7. In the Bermudas it was collected on *L. involucrata*, Nov.-Dec., 1912, Brown, Britton & Seaver 1301, and in St. Thomas on *L. aculeata* L., March, 1913, J. N. Rose.

60. PUCCINIA URBANIANA P. Henn. Hedwigia 37:278. 1898.

ON VERBENACEAE:

*Valerianodes jamaicensis* (L.) Medic. (*Abena jamaicensis* Hitchc., *Stachytarpheta jamaicensis* Vahl), Santurce, June 12, 1912, 64, Jan. 16, 241; Vega Baja, Nov. 5, 4232; Manati, Nov. 25, 4900, 5280; Guayama, Oct. 4, 5554; River junction below Utuado, Dec. 16, 6038.

*Valerianodes strigosa* (Vahl) Kuntze (*Stachytarpheta strigosa* Vahl), Cabo Rojo, June 15, 2285; Mona Island, Dec. 20, 21, 6252, 6279.

Porto Rican collections on *V. jamaicensis* have also been made at San Juan, May, 1903, F. S. Earle, and Feb., 1911, E. W. D. Holway; at Mayagüez, April, 1904, G. P. Clinton; and at Rio Piedras, Feb., 1913, J. R. Johnston 946.

Other West Indian collections have been made in Cuba, March, 1906, by C. F. Baker 830, in Jamaica, Oct.-Nov., 1902, by F. S. Earle 204, Jan., 1903, by L. M. Underwood, Feb., 1913, by E. W. D. Holway 216, and in the Bahamas, Nov., 1890, by A. S. Hitchcock, and March, 1903, by E. W. D. Holway (Barth, N. Am. Ured. 669).

61. **Puccinia Leonotidis** (P. Henn.) comb. nov.*Uredo Leonotidis* P. Henn. in Engler, Pfl. Ost.-Afr. C: 52.

June, 1895.

*Accidium Leonotidis* P. Henn. in Engler, Pfl. Ost.-Afr. C: 52.

June, 1895.

*Uredo cancerina* P. Henn. Hedwigia 34: 330. December, 1895.*Uredo leonoticola* P. Henn. Hedwigia 38: 69. 1899.*Puccinia leonotidicola* P. Henn. in Baum, Kun.-Samb. Exp. 1903.

## ON LABIACEAE (LABIATAE):

*Leonotis nepetaefolia* (L.) R. Br., Yabucoa, May 17, 1912, 4; Coamo Springs, Jan. 1, 127, April 6, 845; Hormigueros, Jan. 14, 216; Bayamon, Feb. 14, 390; Lares, Nov. 22, 4836, 4916; Guayama, Dec. 4, 5336; Ponce, Dec. 4, 5394; Guayanilla, Nov. 13, 5869.

The West Indian collections examined are from Ponce, P. R., Jan., 1911, E. W. D. Holway; Rio Piedras, P. R., 1912, J. R. Johnston, 454, 498, between Aibonito and Cayey, P. R., Feb., 1899, A. A. Heller 557; Kingston, Jamaica, Oct., 1899, G. Lagerheim, and July, 1910, Eug. Mayor 119; Port Antonio, Jamaica, Feb., 1915, E. W. D. Holway; Havana, Cuba, March, 1903, E. W. D. Holway (Barth. N. Am. Ured. 781); Nassau, Bahamas, June, 1909, P. Wilson 8437.

So far no American collection has revealed other than urediospores. These are characteristic in being somewhat flattened from above, with the wall slightly thicker in the upper part, and in having three to five, usually four, basal pores close to the hilum. A collection by Lagerheim from Jamaica bears the inscription "*Uredo basipora* Lagerh. n. sp.," which indicates that the peculiar arrangement of pores was seen by Lagerheim, but I do not find that he published his proposed name.

The assignment of the species to the genus *Puccinia*, is based upon observations by Hemmings, who published a description of teliospores, taken from South African material. In my herbarium is a part of the same collection, made April 18, 1900, by the Kunene-Zambesi Expedition, one half of a well rusted leaf, but it shows no teliospores, although there is an abundance of

characteristic urediniospores. A portion of the type material of *Uredo cancerina* and *U. leonotica* has been examined. The species as here indicated seems consistent with other species on related hosts in its morphology, and with tropical forms generally in rarely producing other than repeating spores.

62. PUCCINIA MEDELLINENSIS Mayor, Mem. Soc. Neuch. Sci. 5: 497. 1913.

*Aecidium Hyptidis* P. Henn. Hedwigia 34: 337. 1895.  
*Eriosporangium tucumanense* Arth. (in part) N. Am. Flora 7: 212. 1912.

ON LAMIACEAE (LABIATAE):

*Mesosphaerum atrorubens* (Poir.) Kuntze (*Hyptis atrorubens* Poir.), Santurce, Jan. 22, 255.

*Mesosphaerum pectinatum* (Poir.) Kuntze (*Hyptis pectinata* Poir.) Villa Alba, Jan. 3, III, 49; Coamo Springs, Jan. 1, I, 152; Corozal, Feb. 21, II, 413; Mayagüez, April 30, II, 938, May 1, II, 1065; Rosario, Oct. 27, II, 3834; Lares, Nov. 22, I, II, II, 4921; Cabo Rojo, Dec. 27, II, 6486.

*Mesosphaerum suaveolens* (L.) Kuntze (*Hyptis suaveolens* Poir.), Mayagüez, April 15, 882, Oct. 31, 3892; Ponce, Nov. 11, 4275; Aguada, Nov. 22, 4913; Guayama, Dec. 4, 5397; Guayanilla, Nov. 13, 5867.

Other West Indian collections of this species on *M. pectinatum* are from La Carmelita, P. R., April, 1904, O, I, II, III, G. P. Clinton, 128, Aibonito, P. R., Feb. 1911, II, III, E. W. D. Holway, Mandeville and Kingston, Jamaica, Feb., 1915, E. W. D. Holway, 224, 232.

Collections of urediniospores on *M. suaveolens* have also been made at Constance Springs, Jamaica, Dec., 1910, by A. S. Hitchcock, and at Santiago, Cuba, March, 1903, by E. W. D. Holway.

The form on *M. pectinatum* reported in the North American Flora was confused with the South American form on *M. spicatum*, which until the present time has only been described under the name of *Aecidium tucumanense* Speg. Type material of the latter, however, shows uredinia and telia sparingly among the aecia. The spore-forms are all somewhat larger than those of

the form on *M. pectinatum*, the teliospores measuring about the same length, but half as much wider. The South American species should be called **Puccinia tucumanensis** (Speg.) comb. nov.

Type material of *P. medellinensis* agrees perfectly with the Stevens' collections on *M. pectinatum*, and also with the collections cited in the North American Flora on page 213 of volume 7. Type material of *Aecid. Hyptidis* P. Henn. also agrees with this species in morphological characters, and the host appears to be *M. pectinatum*, as well as one can tell from a few leaves.

All collections so far seen on *M. atrorubens* and *M. suaveolens* show only urediniospores. The teliospores of *P. Hyptidis* and *P. medellinensis*, as well as *P. tucumanensis* are readily told apart, but the urediniospores of these species all have two equatorial pores, and otherwise are too much alike to be distinguished with certainty when taken by themselves. So far as any differences exist, and especially in the large proportion of urediniospores with the vertical axis shorter than the transverse axis, they indicate that the forms can best be placed here.

63. PUCCINIA HYPTIDIS (M. A. Curt.) Tracy & Earle, Bull.  
Miss. Exp. Sta. 34:86. 1895.

*Eriosporangium Hyptidis* (Curt.) Arth. N. Am. Flora 7:211.  
1912.

ON LAMIACEAE (LABIATAE) :

*Mesosphaerum capitatum* (L.) Kuntze (*Hyptis capitata* Jacq.), Mayagüez, Jan. 7, 57, Jan. 30, 305, Jan. 28, 374; Villa Alba, Jan. 3, 105, 136, 149; Coamo Springs, Jan. 1, 100; Vega Baja, Feb. 20, 471; Añasco, Oct. 12, 3526; Rosario, Oct. 27, 3826, Nov. 14, 4841; Quebradillas, Nov. 22, 5166; Monte de Oro near Cayey, Dec. 13, 5707; Lares, Nov. 22, 5932; El Gigante near Adjuntas, Dec. 15, 6023.

The above numbers show only uredinia, and the assignment to *Puccinia Hyptidis* is somewhat uncertain. The size of the urediniospores, thickness of wall, echinulation, pore-arrangement, and the rarity of flattened spores in which the vertical diameter is less than the transverse, are all characters that agree with those of

the urediniospores of *P. Hyptidis*. Until teliospores are discovered, the form is most conveniently left here.

Collections of uredinia on the same host have also been made in Porto Rico at Bayamon, Jan., 1911, in Cuba at Baracoa, March, 1903, and in Jamaica at Port Antonio, Feb., 1915, all by E. W. D. Holway.

#### 64. *Puccinia insititia* sp. nov.

ON LAMIACEAE (LABIATAE) :

*Mesosphaerum latanifolium* (Poir.) Kuntze (*Hyptis latanifolia* Poir.), Aibonito, June 5, 1933.

A small amount of material was found, showing urediniospores only. These spores are quite unlike other American rusts on this genus of hosts so far seen by the writer, especially in having three equatorial pores. The specimen seems identical, so far as it goes, with a collection on the same host from Manos in the Amazon region of Brazil, collected by E. Ule in 1901, and distributed under the name of *Accidium Hyptidis* P. Henn. The Brazilian material shows urediniospores and a few teliospores. Many of the uredinia simulate aecia in gross appearance by the ruptured epidermis becoming white like a peridium, and somewhat in the microscopic appearance by the fine, close sculpturing of the spores. There are no aecia present on the specimen in hand, and probably the name was given from the aecia-like uredinia. On the strength of this Brazilian collection, which is made the type as it is represented in the herbarium of the New York Botanical Garden, the form is here established as a species under the above name, with the following description:

Uredinia hypophyllous, scattered, round, 0.3–0.6 mm. across, rather early naked, encircling epidermis evident, often white and peridiod, urediniospores globoid or broadly ellipsoid, 20–25 by 23–28  $\mu$ ; wall cinnamon-brown, thin, 1–1.5  $\mu$ , densely and finely echinulate-verrucose, the pores 3, equatorial, often indistinct.

Teliospores narrowly ellipsoid, 16–24 by 48–55  $\mu$ , rounded or obtuse above, rounded or narrowed below, slightly or not constricted at septum; wall colorless, thin, 1  $\mu$  or less, smooth; pedicel colorless, delicate, about half length of spore.

65. PUCCINIA SALVIICOLA Diet. & Holw. Bot. Gaz. 24: 33. 1897.

ON LAMIACEAE (LABIATAE):

*Salvia occidentalis* Sw., Mayagüez, Jan. 15, 285, April 17, 526; Corozal, Feb. 21, 407; Aguada, Nov. 22, 5088.

The rust has also been found on the same host in Porto Rico at Caguas, 1899, Mr. & Mrs. A. A. Heller 941, at La Carmelita, April, 1904, G. P. Clinton, and at Ponce, Feb., 1911, E. W. D. Holway. All Porto Rican specimens so far seen show only uredinia. There is a close resemblance between the uredinia of this species and those of *Puccinia medellinensis*, but the teliospores are very unlike. A collection on the same host, made in Jamaica on Mt. Diabolo, 2000 feet altitude, April, 1903, by L. M. Underwood 1802, shows a few telia on the stems, well supplied with characteristic teliospores, and with uredinia on the leaves, which clearly establishes the species for this host in the West Indies. It was collected, showing uredinia only, at Port Antonio, Jamaica, Feb., 1915, by E. W. D. Holway 220, on the same host.

66. PUCCINIA BLECHI Lagerh. Bull. Soc. Myc. Fr. 11: 214. 1895.

*Uredo balaensis* Syd. Ann. Myc. 1: 21. 1903.

ON ACANTHACEAE:

*Blechum Brownei* (Sw.) Juss., Mayagüez, April 16, 525.

The two names cited above appear to belong to the same rust as the one collected by Stevens in Porto Rico, although type material has not been examined. The rust on the same host has also been found in Guatemala, Jan., 1906, W. A. Kellerman 5400.

67. PUCCINIA LATERITIA Berk. & Curt. Jour. Phila. Acad. Sci. 2: 281. 1853.

ON RUBIACEAE:

*Borreria levis* (Lam.) Griseb., Vega Baja, Feb. 20, 474; Cabo Rojo, Sept. 28, 3187; Coamo Springs, Jan. 1, 141; San Sebastian, Nov. 22, 5186.

*Borreria verticillata* (L.) G. F. W. Mey., without locality, June 12, 1912, 31; Mayagüez, July 12, 1912, 45, Jan. 12, 21, Jan. 15, 288; Boqueron, Feb. 15, 347; Bayamon, May 21, 1886; Indura Fria, Maricao, Oct. 8, 3461;

Cataño, Nov. 6, 4191; Utuado, Nov. 8, 4416, 4581a;  
Lares, Nov. 22, 4846bis; Quebradillas, Nov. 22, 5014;  
Aguada, Nov. 22, 5103.  
*Diodia maritima* Thonn., Mayagüez, Feb. 8, 284a, 289.  
*Diodia rigida* C. & S., Manati, May 11, 4243a; Rio Piedras,  
Nov., 5727.  
*Ernodea littoralis* Sw., Boqueron, Feb. 15, 348; Mona  
Island, Dec. 20, 21, 606F, 6058.  
*Mitracarpus portoricensis* Urban, Guanica, Dec. 29, 6827.  
*Spermacoce tenuior* (L.) Lam., Hormigueros, Jan. 14, 213,  
713; Guanica, Feb. 3, 323; Coamo Springs, April 6,  
846; Cabo Rojo, June 15, 2266; San German, Nov. 8,  
5813, 5816.

This common, short cyle rust of warm regions has also been found in Porto Rico on *B. laevis* at Mayagüez, April, 1904, G. P. Clinton, and at Rio Piedras, June, 1912, J. R. Johnston 457, on *B. verticillata*, between Caguás and Cayey, June, July, 1901, Underwood & Griggs 295a, at Rio Piedras, June, 1914, J. A. Stevenson 2013, on *D. maritima*, at Mayagüez, April, 1904, G. P. Clinton 170, Cataño, Feb., 1914, J. R. Johnston 1364, and on *S. tenuior* at Campo Alegre, Dec., 1914, J. A. Stevenson 2459.

From other West Indian islands it has been gathered on *B. laevis* in Jamaica, L. M. Underwood, Jan. 1903, 83, March, 1903, 1736, on *E. littoralis* in New Providence, Bahamas, Nov., 1890, A. S. Hitchcock, on *Hemidiodia ocimifolia* in Cuba, March, 1903, E. W. D. Holway, on *S. tenuior* in Jamaica, Feb., 1891, R. Thaxter, and on *S. aspera* in Jamaica, Jan., 1891, A. S. Hitchcock.

68. PUCCINIA ROSEA (Diet. & Holw.) Arth. Bot. Gaz. 40: 206.  
1905.

*Aecidium roseum* Diet. & Holw. Bot. Gaz. 24: 36. 1807.

*Uredo Agerati* Mayor, Mem. Soc. Neuch. Sci. 5: 595. 1913.

ON CARDUACEAE:

*Ageratum conyzoides* L., Villa Alba, Jan. 3, 112; Utuado,  
Nov. 8, 4395; Monte Alegrillo, Nov. 14, 4714, 4754.

*Eupatorium polyodon* Urban, Barros, Jan. 2, 140.

The several collections show urediniospores only, and in the

absence of teliospores the specific assignment must necessarily be somewhat doubtful.

The only other West Indian material referred to this species comes from Cuba, and also shows only uredinia. It is on *Eupatorium villosum* Sw., a common roadside weed in that region. The rust, which appears to be abundant, has been seen from three localities. It was collected at Gebara, March, 1903, by E. W. D. Holway, at Santiago de las Vegas, April, 1906, by W. T. Horne 17, and occurs on a phanerogamic specimen in the N. Y. Bot. Garden from Cabanas Bay, collected March, 1912, by Britton & Cowell 12816.

69. PUCCINIA TAGETICOLA Diet. & Holw. Bot. Gaz. 24: 26. 1897.

ON CARDUACEAE:

*Tagetes patula* L., Maricao, Jan. 10, II, 200.

This common Mexican rust has not before been reported from the West Indies. The host here represented is the French marigold of the gardens, introduced into cultivation over three hundred years ago from Mexico.

70. PUCCINIA SYNEDRELLAE P. Henn. Hedwigia 37: 277. 1898.

*Puccinia solida* Berk. & Curt. Jour. Linn. Soc. 10: 356. 1869.

Not *P. solida* Schw. 1832.

*Puccinia Emiliae* P. Henn. Hedwigia 37: 278. 1898.

*Dicaeoma cubense* Kuntze, Rev. Gen. 3<sup>3</sup>: 466. 1898.

*Puccinia Tridacis* Arth. Bull. Torrey Club 33: 156. 1906.

*Puccinia Eleutherantherae* Diet. Ann. Myc. 7: 354. 1909.

ON CARDUACEAE:

*Eleutheranthera ruderalis* (Sw.) Sch. Bip., Mayagüez, May 24, 1542; Aguada, Nov. 22, 5095.

*Emilia sonchifolia* DC., Hormigueros, Jan. 14, 212; Guayama, Aug. 28, 2899; Dec. 4, 5342; Yauco, Oct. 3, 3141; San German, Nov. 8, 5805.

*Synedrella nodiflora* (L.) Gaertn., Barros, Jan. 2, 130; Caguas, June 5, 2168; Cabo Rojo, June 11, 2185; St. Catalina, Aug. 28, 2733; Yauco, Oct. 3, 3228; Isabela, Oct. 22, 3736; Rosario, Oct. 27, 3830, without date,

4853; Alegreillo, Nov. 14, 4479; Lares, Nov. 22, 4839; San Sebastian, Nov. 22, 5200; Guayama, Dec. 4, 5418; Monte de Oro near Cayey, Dec. 3, 5675; Jajome Alto, Dec. 3, 5682; Utuado, Nov. 8, 5781; Guayanilla, Nov. 13, 5922.

Other Porto Rican collections of this species are as follows: On *Emilia sonchifolia*, Ponce, Jan., 1912, J. R. Johnston 202, Rio Piedras, June, 1912, and Dec., 1913, J. R. Johnston 456, 1190, Espinosa, Nov., 1914, J. A. Stevenson 2342; on *Synedrella nodiflora*, Rio Piedras, June, 1912, J. R. Johnston, 448, Trujillo Alto, Aug., 1913, J. R. Johnston 1041; and on *Eleutheranthera ruderalis*, Buena Vista, Jan., 1915, J. A. Stevenson 2509.

The species is common throughout the West Indies, as the following collections indicate: on *E. ruderalis*, eastern Cuba, 1856-7, Charles Wright (type of *Puccinia solida* B. & C.), Isle of Pines, Cuba, May, 1904, A. H. Curtis, and on phanerogamic specimens in the herbarium of the N. Y. Bot. Garden from Jamaica, June, 1897, A. Fredholm 3060, from St. Domingo, June, 1910, Pater Fuertes, 174, from Grenada, March, 1905, W. E. Broadway, and from Guadeloupe, 1893, Pére Duss 3264; on *E. sonchifolia*, Jamaica, Jan., 1892, Lloyd 1082, Oct.-Nov., 1902, F. S. Earle 32, March, 1903, and Sept., 1906, L. M. Underwood 1737, 3168, 3352, Feb., 1915, E. W. D. Holway 221, Antigua, Feb. 13, Rose, Fitch & Russell 3315, Martinique, Aug., 1913, F. L. Stevens 2973, and on a phanerogamic specimen in N. Y. Bot. Garden from Grenada, 1904, W. E. Broadway; on *S. nodiflora*, Cuba, Aug., 1910, Britton, Earle & Gager 6272, Jamaica, Dec., 1890, A. S. Hitchcock, April, 1903, L. M. Underwood, Feb., 1915, E. W. D. Holway 218, Barbados, Oct., 1889, G. von Lagerheim (Sydow, Ured. 376), and on a phanerogamic specimen from Tortola, April-May, 1913, W. C. Fishlock 22.

The species has also been collected on *Tridax procumbens* L. in Cuba, Nov., 1904, Baker & O'Donovan 4039, and on *Neurolaena lobata* (L.) R. Br. in Cuba, March, 1903, E. W. D. Holway.

The identification of the host for the type material of *Puccinia solida* B. & C. was made by Dr. B. L. Robinson of the Gray Herbarium in 1910, who found it to be *Eleutheranthera ruderalis*.

71. PUCCINIOSIRA PALLIDULA (Speg.) Lagerh. *Tromsö Mus.*  
Aarsh. 16: 122. 1894.

*Aecidiella Triumfettæ* Ellis & Kelsey, Bull. Torrey Club 24:  
208. 1897.

ON TILIACEAE:

*Triumfetta rhomboidea* Jacq., Santurce, Jan. 22, 256;  
Mayagüez, Feb. 8, 282; Aguada, Nov. 22, 5099.

*Triumfetta* sp., Villa Alba, Jan. 3, 111; Mayagüez, May  
3, 1163, 1180, June 13, 2217, Oct. 31, 3928, 3943;  
Bayamon, May 21, 1883; Aibonito, June 5, 2134;  
Maricao, Oct. 20, 3713; Rosario, Oct. 27, 3769; El  
Gigante near Adjuntas, Dec. 15, 6022; River junction  
below Utuado, 6059.

The other Porto Rican collections examined are on *T. Lappula*  
L., at Ponce, by A. A. Heller 6184, 1902, on *T. rhomboidea* Jacq.,  
at Santurce, by Cook & Collins 292, at Mayagüez, by G. P.  
Clinton 173, 1904, and on *Triumfetta* sp., at Rio Piedras, by  
Johnston & Seaver 991a, 1913.

Material has also been examined from Guadeloupe, on *T.  
grandiflora*, Vahl., and from Jamaica on *T. semitriloba* L.

The species was gathered by Stevens at Caracas, Venezuela,  
July 15, 1913, on an undetermined species of *Triumfetta*.

The leaves of most species of *Triumfetta* are not distinguishable  
with certainty, and where inflorescence does not accompany  
the collection, specific determination of the host is usually im-  
practical.

The transfer of the genus *Pucciniosira* from the family *Uredi-  
naceae* to the *Aecidiaceae* is based upon a number of considera-  
tions, among which the aecidiod peridium and the intercalary  
cells of the catenulate teliospores have had much weight.

Form-genus: **Aecidium**.

Probably all forms listed here belong to heteroecious species  
under *Aecidiaceae*.

72. *Aecidium favaceum* sp. nov.

Pycnia amphigenous, very numerous on discolored spots, 3–5 mm. across, minute, evident, subcuticular,  $60\text{--}90\ \mu$  across, flattened; ostiolar filaments wanting.

*Aecia* hypophylloous, crowded in groups on the pycnial area hemispherical, soon open; peridium about 0.3 mm. across, delicate and evanescent; peridial cells oblong, 12–16 by 22–26  $\mu$ , readily separating, the walls 3–5  $\mu$  thick, the inner slightly thicker and strongly verrucose, the outer smooth, aeciospores globoid or broadly ellipsoid, 15–20 by 16–25  $\mu$ ; wall nearly or quite colorless, 1.5–2  $\mu$  thick, minutely and closely verrucose.

## ON EUPHORBIACEAE:

*Phyllanthus nobilis* (L. f.) Müll. Arg., San German, Jan. 16, 249, May 25, 1849, Dec. 12, 5832; Hormigueros, Oct. 13, 3226 (type).

Three species of *Aecidium* have already been named which are said to be on *Phyllanthus* sp. Type material of *Aecid. detritum* Thüm. from Brazil has been examined and found quite unlike the West Indian species in all important details. The descriptions of *A. Phyllanthi* P. Henn. from New Guinea, and of *A. luzoniense* P. Henn. from the Philippines, also seem very unlike the material in hand, judging from descriptions.

73. AECIDIUM PASSIFLORIICOLA P. Henn. Hedwigia, 43: 168.  
1904.

## ON PASSIFLORACEAE:

*Passiflora rubra* L., Mayagüez, May 9, 1295.

This form has been collected on the same host at Mayagüez, P. R., April, 1904, by G. P. Clinton 65, and in Jamacia by L. M. Underwood, Jan. 1903, 82, April, 1903, 1746, and Sept., 1906, 3316.

74. AECIDIUM TOURNEFORTIAE P. Henn. Hedwigia 34: 338.  
1895.

## ON BORRAGINACEAE:

*Tournefortia hirsutissima* L., Yauco, Oct. 3, 3127; Rosario, Oct. 27, 3781.

The type collection was made in Brazil. It is here reported for North America for the first time.

75. AECIDIUM TUBULOSUM Pat. & Gaill. Bull. Soc. Myc. Fr. 4: 97. 1888.

*Aecidium Uleanum* Paz. Hedwigia 31: 95. 1892.

*Aecidium solanophilum* Speg. An. Mus. Nac. Hist. Nat. Buenos Aires 23: 34. 1912.

ON SOLANACEAE:

*Solanum torvum* Sw., Mayagüez, May 10, 1912, 1, 2, Jan. 30, 294bis (Barth. Fungi Columb. 4202); Corozal, Feb. 21, 403; Yauco, Oct. 3, 3131; Rosario, Oct. 27, 3776; El Gigante near Adjuntas, Dec. 15, 4191; Maricao, Nov. 18, 4807; Lares, Nov. 22, 4844; Adjuntas, Nov. 22, 4969; Jajome Alto, Dec. 3, 5688; Monte de Oro near Cayey, Dec. 3, 5733; Jayuya, Dec. 17, 6045a; Cabo Rojo, Dec. 27, 6483.

A common and conspicuous rust, which is probably heteroecious. Other Porto Rican collections are on the same host; they are without locality, Geo. P. Goll 456, 1899, Underwood & Griggs 26, 1901, from near Santurce, A. A. Heller 1296, 1899, from Mayagüez, G. P. Clinton 72, 1904, from San Juan, E. W. D. Holway, 1911, and from Rio Piedras, H. B. Cowgill 503, 1912. It has also been collected in Jamaica, Dec., 1890, by A. S. Hitchcock, and in Cuba, March, 1903, by E. W. D. Holway.

The type material of *A. solanophilum* examined, kindly supplied by Dr. Spegazzini, resembles the other specimens in gross appearance of both fungus and host. The microscopic characters also agree, except that the peridial cells seem somewhat smaller and more delicate.

(To be continued)

## THE GENUS CLITOCYBE IN NORTH AMERICA

WILLIAM A. MURRILL

(WITH PLATES 164-166)

Before this large and difficult genus is published in *North American Flora*, it is thought advisable to present a preliminary paper which will direct attention to the group and add to our knowledge of it through additional collections and observations.

Species of *Laccaria*, formerly included in *Clitocybe*, have already been treated in *North American Flora*, volume 10, part 1. *Monadelphus* is another small segregate of *Clitocybe*, which is characterized by a densely cespitose, wood-loving hymenophore. The relation of these two genera to *Clitocybe* and to the segregates of *Tricholoma* may be indicated in the following key:

Lamellae decurrent or adnate.	
Spores not conspicuously verruculose or echinulate, usually ellipsoid; lamellae decurrent or adnate.	CLITOCYBE.
Hymenophore usually solitary or gregarious; subcespitos to cespitose but not wood-loving in <i>C. multiceps</i> and a few other species.	MONADELPHUS.
Hymenophore densely cespitose and wood-loving, attached to decayed trunks or roots.	LACCARIA.
Spores conspicuously verruculose or echinulate, globose; lamellae adnate.	MELANOLEUCA.
Lamellae sinuate; spores usually ellipsoid and smooth.	CORTINELLUS.
Pileus smooth or inconspicuously decorated with fibrils or scales.	
Pileus conspicuously decorated with fibrils or scales.	

### EASTERN SPECIES OF CLITOCYBE

Some of the species here included are confined to the eastern United States, while others may occur throughout temperate North America, or even in Europe or Asia. So little is at present known of the Rocky Mountain region, that it will be treated temporarily as a part of eastern North America. The New

York species have been studied very carefully by Dr. Charles H. Peck.

CLITOCYBE ADIRONDACKENSIS (Peck) Sacc. Syll. Fung.

5: 180. 1887

*Agaricus adirondackensis* Peck, Ann. Rep. N. Y. State Cab. 23: 77. 1872.

Common in woods in the Adirondack region of New York, where it was discovered. Very near *C. infundibuliformis*, but distinguished by its narrow, crowded lamellae.

CLITOCYBE ALBIDULA Peck, Ann. Rep. N. Y. State Mus. 46: 103  
(23). 1893

*Clitocybe centralis* Peck, Ann. Rep. N. Y. State Mus. 53: 841.  
1900.

Described from specimens collected under pine trees at Delmar, New York. It is said to be related to *C. candicans*. Peck reduces *C. centralis* because it "differs from the type only in having the center of the moist pileus sometimes tinged with brown." The species occurs commonly in northern New York in pines or mixed woods and is abundantly represented at Albany.

**Clitocybe albo-umbilicata** (Hoffm.) comb. nov.

*Agaricus umbilicatus* Bolt. Hist. Fung. 1: 36. 1795. Not *A. umbilicatus* Schaeff. 1774.

*Agaricus candicans* Pers. Syn. Fung. 456. 1801. Not *A. candicans* Schaeff. 1774.

*Agaricus albo-umbilicatus* Hoffm. Nom. Fung. —. 1789.

Described from Europe and reported from many parts of the eastern United States, occurring among fallen leaves in woods. Peck reports it common in New York, and I have found it plentiful in the Adirondacks.

CLITOCYBE APERTA (Peck) Sacc. Syll. Fung. 5: 164. 1887

*Agaricus (Clitocybe) apertus* Peck, Ann. Rep. N. Y. State Mus. 30: 38. 1878.

Described from Maryland, Otsego County, New York, and found rarely in groups or clusters in grassy ground by roadsides and in pastures. Peck first collected it in quantity and called it *C. dealbata*, a species which it resembles very closely.

**CLITOCYBE BIFORMIS** Peck, Bull. N. Y. State Mus. 150: 25. 1911

Known only from a single collection at North Elba in the Adirondacks, growing in circles or arcs of circles in mixed woods. Not distinct from *C. inversa*.

**CLITOCYBE CAESPITOSA** Peck, Ann. Rep. N. Y. State Mus.  
41: 61. 1888

Described from the Catskill Mountains, New York, and found afterwards in the Adirondacks. It is a rare species, occurring in clusters in woods, and is remarkable for its irregular and deformed appearance. Specimens at Albany collected in Michigan by Beal resemble a young, subclustered stage of *C. adirondackensis*, and it seems probable that further studies may connect the two species.

**CLITOCYBE CATINA** (Fries) Quél. Champ. Jura Vosg. 215. 1872  
*Agaricus (Clitocybe) catinus* Fries, Epicr. Myc. 72. 1838.

Reported once rather doubtfully from the Adirondack Mountains, New York, by Peck, who says that the species is related to *C. infundibuliformis*, but is easily distinguished by its white color. Reported also from Kansas by Bartholomew as occurring in short grass in the open prairie.

**CLITOCYBE CHRYSOCEPHALA** Sacc. Syll. Fung. 5: 190. 1887  
*Agaricus (Clitocybe) auratocephalus* Ellis, Bull. Torrey Club 6:  
75. 1876.

Described from Newfield, New Jersey, occurring there in swampy ground in July. The whole plant is golden-yellow and has a strong, peculiar smell. The spores are short-oblong and  $10\ \mu$  long, very different from those of *Monodelphus illudens*. I have found no specimens of it in the Ellis collections, at least

among the white-spored agarics; it may possibly have been transferred to another series.

CLITOCYBE COLUMBANA (Mont.) Sacc. Syll. Fung. 5: 142. 1887

*Agaricus (Clitocybe) columbanus* Mont. Syll. Crypt. 102. 1856.

Described from specimens collected on naked ground at Columbus, Ohio. The types at Paris are large, closely clustered, and have the appearance of *Clitocybe illudens*, but the sphere are ellipsoid,  $7 \times 4 \mu$ . The color of the plant when fresh is not stated in the description.

CLITOCYBE CLAVIPES (Pers.) Quél. Champ. Jura Vosg. 48. 1872

*Agaricus clavipes* Pers. Syn. Fung. 353. 1801.

*Agaricus carnosior* Peck, Ann. Rep. N. Y. State Cab. 23: 76. 1872.

This well known edible species was described from Europe and occurs commonly on the ground in woods throughout most of temperate North America south to the mountains of North Carolina and west to Oregon.

CLITOCYBE COMPRESSIPES (Peck) Sacc. Syll. Fung. 5: 184. 1887

*Agaricus (Clitocybe) compressipes* Peck, Ann. Rep. N. Y. State Mus. 33: 18. 1883.

Described from Albany County, New York, growing in pastures or grassy places and later collected also in Warren County. Peck states that this species is near *C. ditopus*, but is distinguished by its umbilicate pileus and paler or whitish lamellae. Dodge reports it from Wisconsin, occasionally growing in clusters of twenty hymenophores. Compare *Hygrophorus*.

CLITOCYBE CONCAVA (Scop.) Gill. Champ. Fr. 150. 1874

*Agaricus concavus* Scop. Fl. Carn. ed. 2. 2: 449. 1772.

*Agaricus cyathiformis* Fries, Syst. Myc. 1: 173. 1821. Not *A. cyathiformis* Bull. pl. 248. 1785.

*Agaricus Poculum* Peck, Ann. Rep. N. Y. State Cab. 23: 77. 1872.

This shapely and easily recognized species was originally described from Paris by Vaillant, but the first binomial was assigned to specimens collected in Carniola. It is widely distributed on decaying wood or on the ground in woods or in mossy fields throughout Europe and the northern part of North America southward to South Carolina and Ohio and westward to Oregon and Bering Strait. The species has many names. That assigned by Fries and generally used is not tenable because it was antedated by Scopoli's name and also because the first plant to which Bulliard's name was assigned was not this species, but a smaller one usually known as *C. metachroa*. See *Clitocybe dicolor*.

CLITOCYBE CONNEXA (Peck) Sacc. Syll. Fung. 5: 197. 1887

*Agaricus (Clitocybe) connexus* Peck, Bull. Buffalo Soc. Nat. Sci. 1: 45. 1873.

Described from specimens collected on the ground in woods at Croghan, New York. Dodge reports it from Wisconsin in low woods of maple and beech, and says that the pale, sky-blue colors mentioned by Peck are visible only at close range. In a recent bulletin, Peck makes this species a synonym of *C. Trogii* (Fries) Sacc. and says that it is closely allied to *C. virens*, from which it differs in the grayish and more compact pileus and the constantly solid stipe. It is said to have a fragrant, spicy odor.

CLITOCYBE DEALBATA (Sow.) Gill. Champ. Fr. 152. 1874

*Agaricus dealbatus* Sow. Engl. Fungi pl. 123. 1797.

This very common and well known species was described from England and occurs gregariously in open places throughout Europe and temperate North America. *C. sudorifica* Peck and *C. morbifera* Peck appear to be indistinguishable from this species morphologically, and it seems probable that we have to deal here with a species that varies in its physiological effects when ingested.

**Clitocybe dicolor (Pers.) comb. nov.**

*Agaricus cyathiformis* Bull. Herb. Fr. pl. 248. 1785. Not *A. cyathiformis* Schaeff. 1774.

*Agaricus dicolor* Pers. Syn. Fung. 462. 1801.

*Agaricus metachrous* Fries, Syst. Myc. 1: 172. 1821.

*Clitocybe metachroa* Quél. Champ. Jura Vosg. 216. 1872.

Described from Europe, where it is common in pine woods, and reported once by Peck in pine woods in Albany County, New York. It has also been reported from Maryland and New Brunswick. Hard's Ohio specimens are probably incorrectly determined. Romell has recently collected this species in abundance at Femsjö, Sweden, where it was first known to Fries. Bulliard's plate 248, containing the original description of *A. cyathiformis*, is said by Fries to represent two species, *C. metachroa* and *C. brumalis*, but I prefer to consider it as representing the two stages in *C. metachroa*, showing the change in color both of the surface and the lamellae. *C. brumalis* is very similar to *C. metachroa*, but the lamellae do not change color.

**Clitocybe Earlei** sp. nov.

Pileus thin, rather tough, convex to expanded, subumbonate, solitary or gregarious, reaching 8 cm. broad; surface glabrous, shining, subhygrophanous, smooth, dark-seal-brown when moist, fuscous when dry, margin entire, concolorous, inflexed; context firm, white with a brownish tint, the taste mild, slightly mawkish, the odor not characteristic; lamellae short-decurrent, several times inserted, some of them forking, densely crowded, narrow, white; spores ellipsoid, smooth, hyaline,  $7.5-9 \times 5-6.5 \mu$ ; stipe subcylindric, enlarged at the base, pallid when young, soon becoming concolorous, solid, smooth, glabrous, reaching 15 cm. long and 1-1.5 cm. thick.

Type collected on the ground in mixed, rocky woods at West Park, New York, August 6, 1903, F. S. Earle 1753. Not collected since.

**CLITOCYE ECCENTRICA** Peck, Bull. Torrey Club 25: 321. 1898

Described from specimens collected on much decayed wood in Vermont and later collected in Connecticut, New York, Pennsylvania, western North Carolina, and Wisconsin. Dodge finds the stipe only slightly eccentric.

CLITOCYBE ECTYPOIDES (Peck) Sacc. Syll. Fung. 5: 169. 1887

*Agaricus (Clitocybe) ectypoides* Peck, Ann. Rep. N. Y. State Mus. 24: 61. 1872.

Described from Sandlake, New York, and occurring rather frequently on decaying wood in woods from Maine to Alabama and west to Wisconsin. I once made seven collections of it in Maine on dead coniferous wood.

CLITOCYBE ERUBESCENS (Mont.) Sacc. Syll. Fung. 5: 150. 1887

*Agaricus (Clitocybe) erubescens* Mont. Syll. Crypt. 103. 1856.  
Not *A. erubescens* Fries, 1821.

Described from specimens collected on fallen logs at Columbus, Ohio, by Sullivant. The types at Paris, which are poorly preserved, suggest either a true *Clitocybe* or a species of *Hygrophorus*, near *H. pratensis*. The stipe is thick; the lamellae narrow to broad and distant; and the pileus smooth, viscid, and 2.5 cm. broad in its present dried state. The spores are oblong-ellipsoid, somewhat fusiform, smooth, hyaline,  $4-5 \times 2-3 \mu$ .

CLITOCYBE FELLEA Peck, Ann. Rep. N. Y. State Mus. 51: 284.  
1898

Found once at Gansevoort, Saratoga County, New York, growing gregariously on the ground in woods. The author cites the pale color, deep umbilicus, and bitter taste as prominent characters. I have not seen this species.

CLITOCYBE FLACCIDA (Sow.) Quél. Champ. Jura Vosg. 329. 1873

*Agaricus flacidus* Sow. Engl. Fungi pl. 185. 1798. Not *Agaricus flacidus* Bull. 1788.

Described from England and reported as occurring in pine woods in Massachusetts and Maryland. A study of Sowerby's plate and of specimens at Kew, in connection with specimens collected at Paris, leads me to believe that this is none other than our old friend *C. inversa*; in which case its occurrence in this country is correctly reported.

CLITOCYBE FLAVIDELLA (Peck) Sacc. Syll. Fung. 5:197. 1887

*Agaricus* (*Clitocybe*) *flavidellus* Peck, Ann. Rep. N. Y. State Mus. 30:38. 1878.

Found only once growing gregariously in wet, swampy ground at Maryland, Otsego County, New York. The type specimens may still be seen at Albany.

CLITOCYBE FUMOSA (Pers.) Quél. Champ. Jura Vosg. 214. 1872

*Agaricus fumosus* Pers. Syn. Fung. 348. 1801.

Described from Europe as frequent in woods and grassy places, and reported from New England, New York, Pennsylvania, and North Carolina. Bambeke says it sometimes grows in circles. Peck reports it from Albany and Ontario Counties. The specimens at Albany formerly labeled *C. ampla* Pers. are now marked *C. fumosa*.

CLITOCYBE FUSCIPES Peck, Ann. Rep. N. Y. State Mus. 44:129  
(17). 1891

Found only once under pine trees at Carrollton, Cattaraugus County, New York. The small type specimens are still preserved at Albany.

CLITOCYBE GALLINACEA (Scop.) Gill. Champ. Fr. 150. 1874

*Agaricus gallinaceus* Scop. Fl. Carn. ed. 2. 2:433. 1772.

Described from Carniola and reported once by Peck from the Adirondacks, New York, occurring in grassy or mossy places. Peck states that it has a decidedly acrid taste and strong odor and that its color is dingy-white.

CLITOCYBE GERARDIANA (Peck) Sacc. Syll. Fung. 5:181. 1887

*Agaricus* (*Clitocybe*) *Gerardianus* Peck, Bull. Buffalo Soc. Nat. Sci. 1:46. 1873.

Described from Sandlake, New York, occurring in sphagnum marshes, and later collected at New Platz, New York. This was transferred to *Omphalia* in 1893, where it seems to belong. Peck says it is related to *C. ectypoides*, but is much more slender and fragile.

CLITOCYBE GIGANTEA (Sow.) Quél. Champ. Jura Vosg. 51. 1872

*Agaricus giganteus* Sow. Engl. Fungi pl. 244. 1800.

Reported from Wisconsin by Dodge, who says it differs from *Clitocybe maxima* in having a much shorter and thicker stipe.

**Clitocybe hiemalis** nom. nov.

*Agaricus brumalis* Fries, Obs. Myc. 2:206. 1818. Not *A. brumalis* Scop. 1772.

Described from Europe and reported by Peck as rare in woods in the Catskills and Adirondacks; also previously reported from North Carolina and Greenland. I found it in abundance in Kew Gardens in November, 1910.

CLITOCYBE HOFFMANI (Peck) Sacc. Syll. Fung. 5:197. 1887

*Agaricus (Clitocybe) Hoffmani* Peck, Ann. Rep. N. Y. State Mus. 24:60. 1872.

Known only from specimens collected on much decayed wood in woods at Greig, New York. As this species is not mentioned in Peck's recent state list, it may have been transferred by him to some other genus.

CLITOCYBE INFUNDIBULIFORMIS (Schaeff.) Quél. Champ. Jura Vosg. 52. 1872

*Agaricus infundibuliformis* Schaeff. Fung. Bavar. 4: Ind. 49. 1774.

This extremely common species was originally described from Europe and occurs among fallen leaves in woods throughout eastern temperate North America westward as far as Iowa and Kansas. The plant tends to assume somewhat darker colors in Europe, so far as I have observed.

CLITOCYBE INVERSA (Scop.) Quél. Champ. Jura Vosg. 214. 1872

*Agaricus inversus* Scop. Fl. Carn. ed. 2. 2:445. 1772.

*Agaricus gilvus* Pers. Syn. Fung. 448. 1801.

*Clitocybe maculosa* Peck, Bull. Buffalo Soc. Nat. Sci. 1:45. 1873.

*Agaricus (Clitocybe) subzonalis* Peck, Bull. Buffalo Soc. Nat. Sci. 1:46. 1873.

*Clitocybe biformis* Peck, Bull. N. Y. State Mus. 150:25. 1911.

This large and handsome species was described from Carniola and occurs in humus in woods or groves throughout Europe and the northern United States, having been collected rather commonly in Maine, New York, Washington, and Oregon. In Paris, the writer once found it growing in the greatest profusion beneath the giant cedar of Lebanon at the south end of the Jardin des Plantes. The species must have been very familiar to Bulliard, who figured it in his plate 553 under the name of *Agaricus infundibuliformis*, one of its many appellations. *C. geotropa* is said to have spores  $6-7 \times 4-5 \mu$ , while those of *C. inversa* are  $4.5-5 \times 3-4 \mu$ .

CLITOCYBE LEPTOLOMA Peck, Bull. N. Y. State Mus. 157:68.

1912

*Agaricus (Clitocybe) leptolomus* Peck, Ann. Rep. N. Y. State Mus. 32:26. 1880.

Described from specimens on decaying prostrate trunks in woods at Indian Lake in the Adirondack Mountains, New York. It is reported as uncommon and no other locality is cited for the species. It is said to differ from *C. truncicola* in having a hygrophanous, umbilicate pileus.

CLITOCYBE MACULOSA (Peck) Sacc. Syll. Fung. 5:183. 1887

*Agaricus (Clitocybe) maculosus* Peck, Bull. Buffalo Soc. Nat. Sci. 1:45. 1873. Not *A. maculosus* Pers. 1801.

Described from specimens collected on the ground in woods at Croghan, New York. Not distinct from *C. inversa*.

CLITOCYBE MAXIMA (Gärtn. & Meyer) Quél. Champ. Jura Vosg. 51. 1872

*Agaricus maximus* Gärtn. & Meyer, Fl. Wett. 3<sup>2</sup>:329. 1802.

I examined this species in the Hooker herbarium at Kew and elsewhere, but found no specimens from America and its occurrence here must be considered doubtful, although it has been reported from Minnesota, Massachusetts, California, and else-

where. Peck says it is rare in the Adirondacks and Catskills, occurring in woods and grassy places, and that it is easily recognized by its large size. Dodge reports it from Wisconsin.

CLITOCYBE MEDIA Peck, Ann. Rep. N. Y. State Mus. **42**: 114 (18).  
1889

Described from North Elba in the Adirondack Mountains, New York, occurring there rarely on mossy ground in woods, and later reported from Wisconsin. Peck considers it intermediate between *C. nebularis* and *C. clavipes*, but it certainly approaches the latter species very closely.

CLITOCYBE MEGALOSPORA Clements, Bot. Surv. Neb. **4**: 18. 1896

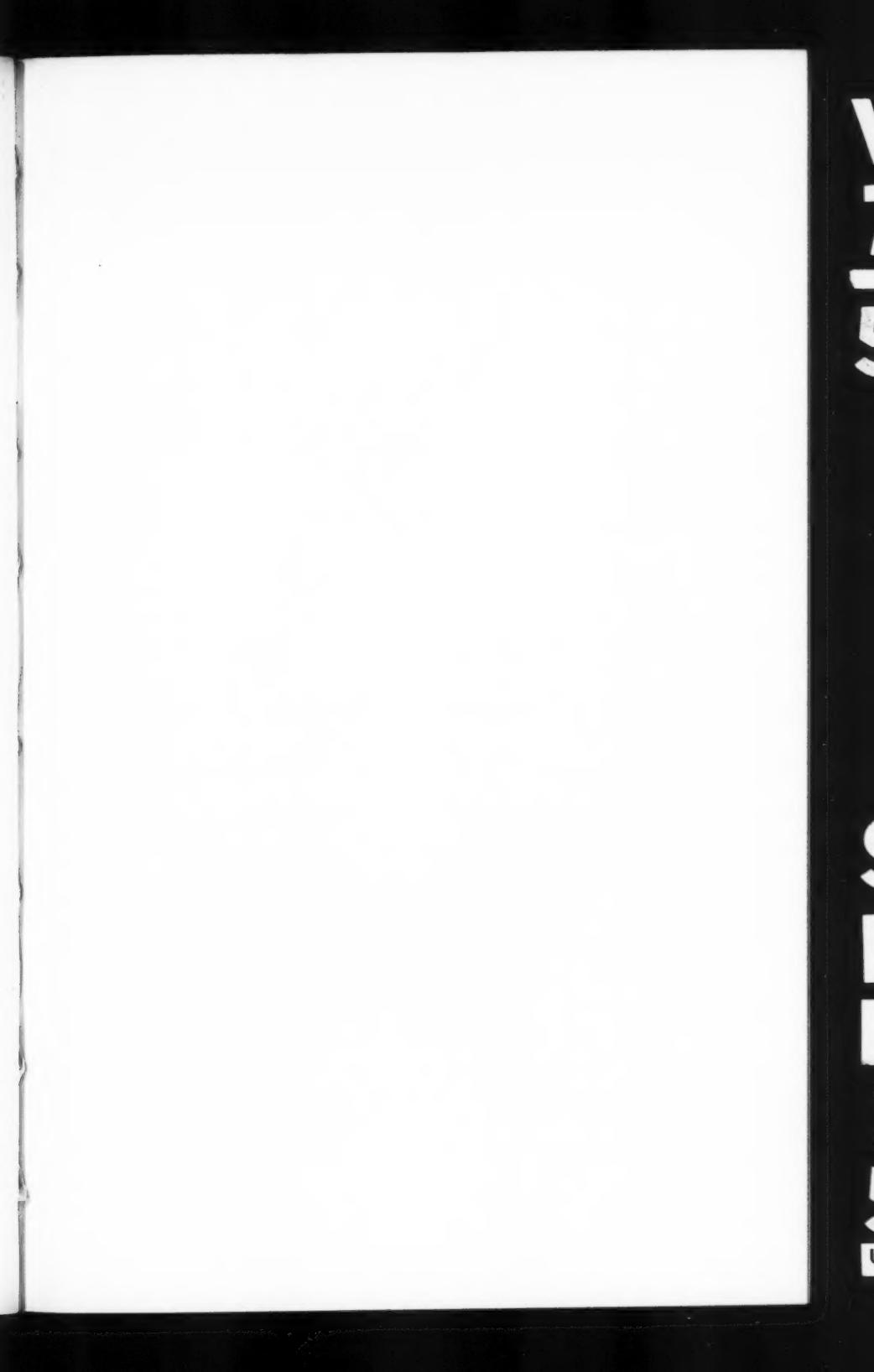
Not a species of *Clitocybe*. See *Mycologia* **7**: 157. 1915.

CLITOCYBE MORBIFERA Peck, Bull. Torrey Club **25**: 231. 1898

Described from specimens collected on grassy ground and lawns at Washington, D. C., by F. J. Braendle. The taste is reported as very disagreeable and persisting for a long time. Two by Dr. Fischer from Detroit, Michigan, and in both cases sickness lasting about three hours. In Bulletin 150, Peck reports specimens sent by Dr. Whetstone from Minneapolis, Minnesota, and by Dr. Fischer from Detroit, Michigan, and in both cases sickness was produced after the fungus had been eaten in quantity. Dr. Peck concludes that although *C. morbifera* is scarcely distinguishable morphologically from *C. sudorifica* the ill effects of the former are much more serious and uncomfortable than those of the latter species. Specimens of *C. dealbata* collected at Seattle were compared at Albany with specimens of *C. morbifera* collected by Dr. Whetstone in Minnesota in 1905, and found to agree in every particular.

CLITOCYBE MULTICEPS Peck, Ann. Rep. N. Y. State Mus. **43**: 17.  
1890

This large and important edible species was originally described from Albany and Sandlake, New York, occurring in open grassy places in late spring or early summer and again in the





CLITOCYBE MULTIFORMIS PECK

autumn. It has been described and twice figured in *Mycologia*. Sometimes the lamellae are adnexed or slightly sinuate, suggesting *Melanoleuca*. The species is known to occur in many parts of the eastern United States from Canada to New Jersey, and it may possibly extend westward to Washington. It is very abundant in some localities in the vicinity of New York City. By removing pieces of sod containing the mycelium, it is possible to transplant it rather easily, and it increases rapidly when once established in a lawn.

CLITOCYBE MULTIFORMIS Peck, Mem. N. Y. State Mus. 3:141.  
1900

Described from several specimens collected at one time in Albany County, New York, growing in a low damp place in woods. Although a prominent species and well illustrated by Peck, it has not been reported since. It is said to be smaller and thinner than *Clitocybe multiceps*, although similar in habit and edible. The pileus is whitish, grayish, or yellowish when moist becoming paler when dry. What appears to be this species was twice collected at Stockbridge, Massachusetts, by Dr. W. W. Gilman Thompson and myself early in October, 1911. (*pl. 164*).

CLITOCYBE NOBILIS Peck, Bull. Torrey Club 34:97. 1907

Described and known only from specimens collected on humus and buried wood at Deer Lake, Ontario, by C. Gillet. The type specimens at Albany appear quite distinct, with particularly long stipes.

CLITOCYBE PELTEGERINA (Peck) Sacc. Syll. Fung. 5:184. 1887  
*Agaricus (Clitocybe) peltigerinus* Peck, Ann. Rep. N. Y. State  
Mus. 30:38. 1885.

This rare species was described from specimens collected on decaying *Peltigera* at Oneida, New York, and afterwards found at North Greenbush, New York. The minute type specimens may be seen at Albany.

CLITOCYBE PHYLLOPHILA (Pers.) Quél. Champ. Jura Vosg. 49.  
1872

*Agaricus phyllophilus* Pers. Syn. Fung. 457. 1801.

This species was described from Europe and is reported by Peck as rare in Albany County; and also by other mycologists from Massachusetts, North Carolina, Ohio, Indiana, Minnesota, and Wisconsin. I have a number of recent collections of the plant from Vermont, Massachusetts, and New York. It occurs among sticks and leaves on the ground in woods.

CLITOCYBE PHYLLOPHILOIDES Peck, Bull. N. Y. State Mus. 167:  
19. 1915

Described from specimens collected among fallen leaves in spruce woods at Constableville, New York. The types have not been examined.

**Clitocybe pileolaria** (Bull.) comb. nov.

*Agaricus pileolarius* Bull. Herb. Fr. pl. 400. 1788.

*Agaricus nebularis* Batsch, Elench. Fung. Contin. 2:25. 1789.

*Agaricus mollis* Bolt. Hist. Fung. 1:63. 1795.

*Clitocybe nebularis* Quél. Champ. Jura Vosg. 48. 1872.

Originally described from France, occurring among dead leaves in woods, and very well figured by Bulliard, as well as by Barla, Bresadola, Fries, Hussey, Bolton, and others. Peck's figures in Report 48 are not suggestive of the European plant, and the spores of his specimens are  $4-6 \times 2-3 \mu$ , while those of the European plant are  $8-10 \times 5-7 \mu$ . The species has been reported from Canada to North Carolina and west to the Rocky Mountains, and there are many specimens so named at Albany, but apparently there remains much to be determined regarding its occurrence in this country.

CLITOCYBE PINIARIA (Bosc) Sacc. Syll. Fung. 5:148. 1887

*Agaricus piniarius* Bosc, Ges. Nat. Freunde Berlin Mag. 5:84.  
1811.

*Agaricus (Clitocybe) piniarius* Fries, Epicr. Myc. 59. 1838.

Described and known only from specimens collected in pine woods in South Carolina. Fries did not see these specimens.

CLITOCYBE PINOPHILA (Peck) Sacc. Syll. Fung. 5:183. 1887

*Agaricus (Clitocybe) pinophilus* Peck, Ann. Rep. N. Y. State Mus. 31:32. 1879.

Described from Albany, New York, occurring rarely under or near pine trees, and reported later from Essex and Warren Counties, New York.

CLITOCYBE PITHYOPHILA (Fries) Gill. Champ. Fr. 152. 1874

*Agaricus (Clitocybe) pithyophilus* Fries, Syst. Myc. 1:83. 1821.

Described from Europe and reported from New England, New York, and Ohio, usually occurring in pine woods. Hard gives a good illustration of this species in his recent work.

CLITOCYBE PORPHYRELLA (Berk. & Curt.) Sacc. Syll. Fung.

5:196. 1887

*Agaricus (Clitocybe) porphyrellus* Ann. Mag. Nat. Hist. III. 4:284. 1859.

Described from specimens collected in leaf-mold in Connecticut by Wright. The types at Kew are old and unreliable for comparison. The pale-purple color of the entire plant would seem to suggest *Mycena pura* or one of the species of *Laccaria*.

CLITOCYBE PRUINOSA Lovejoy, Bot. Gaz. 50: 384. 1912.

Not *Clitocybe pruinosa* (Lasch) Quél. 1872

Described from specimens collected in open pine woods at Foxpark, Wyoming, August 14, 1909. The pileus is described as 3.5 cm. wide, smooth, and rich-reddish-brown over salmon; the lamellae as salmon-yellow, crowded, and very decurrent; and the spores as globose, spiny, 7-10.5  $\mu$ . This would seem to indicate a species of *Laccaria* if the lamellae were not so decurrent. Its relationship may be with *C. sinopica*.

## CLITOCYBE PULCHERRIMA Peck, Jour. Myc. 14:1. 1908

Described from specimens collected by Dr. O. E. Fischer among fallen leaves near Detroit, Michigan. The types of this beautiful, lemon-yellow species are at Albany.

CLITOCYBE RADIOPHORA (Johnson) Sacc. Syll. Fung. 9:20.  
1891

*Agaricus (Clitocybe) radiosonarius* Johnson, Bull. Minn. Acad. Sci. 1:214. 1887.

Described from Minnesota, occurring on decaying fallen branches and stumps in June. The specimens are lost, but the description resembles that of *Crinipellis sonata*.

## Clitocybe rancidula (Banning &amp; Peck) comb. nov.

*Tricholoma rancidulum* Banning & Peck; Peck, Ann. Rep. N. Y. State Mus. 44:179 (67). 1891.

Known only from specimens collected in vegetable mold in Druid Hill Park, Baltimore, Maryland, by Miss Banning. The lamellae are slightly decurrent and very narrow and crowded. The plant is larger than *T. personatum*, the stipe is not bulbous, and the margin of the pileus is finely striate for about 2 cm. Its odor is very rancid, whence the name.

CLITOCYBE REGULARIS Peck, Bull. N. Y. State Mus. 10:948.  
1902

Described from specimens collected among fallen leaves in woods at Bolton, New York. Specimens recently collected at Austin, Texas, by F. McAllister appear to correspond to the New York specimens in every particular.

CLITOCYBE RIVULOSA (Pers.) Quél. Champ. Jura Vosg. 214.  
1872

*Agaricus rivulosus* Pers. Syn. Fung. 369. 1801.

Described from Europe and twice reported by Peck from the Adirondacks. It was also reported from the Antilles by Fries in 1851.

CLITOCYBE ROBUSTA Peck, Ann. Rep. N. Y. State Mus. 49: 17.  
1897

Described from the Catskill Mountains and found several times since in New York, growing among fallen leaves in woods. It has been reported from as far south as Maryland and as far west as Wisconsin. *Clitocybe candida* Bres. has been confused with this species.

CLITOCYBE SETISEDA (Schw.) Sacc. Syll. Fung. 5: 176. 1887  
*Agaricus (Omphalia) setisedus* Schw. Schr. Nat. Ges. Leipzig  
1: 88. 1822.

*Agaricus (Clitocybe) setisedus* Fries, Epicr. Myc. 73. 1836.

Described from North Carolina, occurring among fallen leaves. I have seen no specimens.

CLITOCYBE SINOPICA (Fries) P. Karst. Bidr. Finl. Nat. Falk 32:  
73. 1879

*Agaricus sinopicus* Fries, Obs. Myc. 2: 197. 1818.

Described from Europe and frequent in woods and on burned ground in open places throughout most of temperate North America, having been found as far south as Tennessee and South Carolina and west to the Pacific coast. *Clitocybe Arnoldi* Boud. is only a variety of this species. *Agaricus (Tricholoma) Sienna* Peck also appears to be a large form of the same plant. *Clitocybe subconcava* Peck is very near.

CLITOCYBE SINOPICOIDES Peck, Bull. N. Y. State Mus. 157: 80.  
1912

Described from the Adirondacks, occurring there among mosses in low, wet places. Peck says it differs from *C. sinopica* in its habitat, smaller size, and smaller spores, but all these differences appear to me to be very slight. I have some small specimens collected in Maine which Bresadola pronounced "not *sinopica*," but which correspond to specimens at Albany determined as *C. sinopica*. Bresadola's idea of *C. sinopica* is a rather large plant with a much thicker stipe than is usually seen in our American specimens.

## CLITOCYBE SOCIALIS (Fries) Sacc. Syll. Fung. 5: 149. 1887

*Agaricus socialis* Fries, Hymen. Eur. 83. 1874.

Reported by Moffatt as occurring among dead leaves on a wooded hillside in the vicinity of Chicago, Illinois. He says that it is remarkable for its very acute umbo, and that the spores are globose, echinulate,  $9-10\mu$ . I have not seen his specimens.

## CLITOCYBE SPLENDENS (Pers.) Gill. Champ. Fr. 139. 1874

*Agaricus splendens* Pers. Syn. Fung. 452. 1801.

Described from Europe and reported by Peck as rare among fallen leaves in woods in the Adirondacks. It is very probable that American specimens bearing this name may all be referred to *C. sinopica*, *C. subsquamata*, or *C. inversa*.

CLITOCYBE SUBCONCAVA Peck, Bull. N. Y. State Mus. 54: 948.  
1902

Described from Bolton, New York, growing in pine woods. There are seven specimens on the type sheet at Albany, but the species has not been reported since. It should be carefully compared with forms of *C. sinopica*.

## Clitocybe subconnexa sp. nov.

Pileus convex to expanded, rather thin, very tender and fragile, somewhat cespitose, reaching 9 cm. broad; surface smooth, dry, glabrous, milk-white; margin very thin, concolorous, entire, strongly incurved on drying; context thin, white, fragile, with pleasant odor and taste; lamellae short-decurrent or adnate, narrow, white, exceedingly crowded, several times inserted; spores ellipsoid, smooth, hyaline,  $5 \times 3.5\mu$ ; stipe fleshy, subequal, smooth, glabrous, white, hollow, 5-7 cm. long, reaching 1.5 cm. thick.

Type collected in rich soil under trees in the New York Botanical Garden, September 26, 1911, W. A. Murrill. Also collected in the grass near the herbaceous nursery of the New York Botanical Garden, September 25, 1907, R. C. Benedict. This species somewhat resembles *C. multiceps* but it is thinner and more fragile and the lamellae are much more crowded.

**CLITOCYBE SUBCYATHIFORMIS** Peck, Bull. N. Y. State Mus. 122: 136. 1908

Described from specimens collected among fallen leaves under alders and birches in Albany and Warren Counties, New York. It is said to be rare. The species is well illustrated, and the types, which somewhat resemble *C. infundibuliformis*, are at Albany.

**CLITOCYBE SUBDITOPODA** Peck, Ann. Rep. N. Y. State Mus. 42: 114 (18). 1889

Originally collected in mossy ground in woods in the Adirondack Mountains at North Elba, New York, and reported by Peck as rare. I collected the species near Lake Placid in July and in October, 1912. Peck says it differs from *C. ditopoda* Fries in its umbilicate pileus, striate margin, and broader, paler lamellae.

**CLITOCYBE SUBHIRTA** Peck, Bull. N. Y. State Mus. 1<sup>2</sup>: 11. 1888**Agaricus (Clitocybe) subhirtus** Peck, Ann. Rep. N. Y. State Mus. 32: 25. 1880.

Described from specimens collected at Brewerton, New York, occurring there on the ground in woods. There are four good specimens on the type sheet at Albany. The lamellae are broad and have a peculiar rosy-cream color as in some species of *Russula*. Specimens collected at Stockbridge, Massachusetts, in October, 1911, seem to correspond exactly with the types. In my field notes, I remark that the lamellae are sinuate and that the plant is probably a *Melanoleuca*.

**Clitocybe submarmorea** nom. nov.**Agaricus (Clitocybe) marmoreus** Peck, Ann. Rep. N. Y. State Mus. 24: 61. 1872. Not *A. marmoreus* Lam.

This large, cespitose species was described from specimens found on prostrate trunks of trees in woods at Greig, New York, and has not been reported since. The clusters are composed of few individuals. There are two specimens at Albany, accom-

panied by an excellent sketch. The surface is represented as white mottled with darker, watery spots.

CLITOCYBE SUBNIGRICANS Peck, Bull. N. Y. State Mus. 150: 51.  
1911

Described from specimens collected by G. B. Fessenden, at Rye Beach, New Hampshire. The types at Albany have not been examined. Reported by the author as a fine species, easily distinguishable by its strong odor and the blackening of the lamellae and stipe when bruised or on drying.

CLITOCYBE SUBSIMILIS Peck, Ann. Rep. N. Y. State Mus. 41:  
61. 1888

Described from specimens collected under pine trees in the Catskill Mountains, New York. After examining the excellent type specimens at Albany, I have referred the species to *Melanoleuca albissima* (Peck) Murrill.

**Clitocybe subsquamata** nom. nov.

*Agaricus squamulosus* Pers. Syn. Fung. 449. 1801. Not *A. squamulosus* Bull. 1785.

Described from Europe, where it is rare, and occurring frequently in the Adirondacks, usually under pines. The spores measure  $5-7 \times 3-5 \mu$ . Care must be taken not to confuse this species with *C. sinopica*.

CLITOCYBE SUBZONALIS (Peck) Sacc. Syll. Fung. 5: 184. 1887  
*Agaricus (Clitocybe) subzonalis* Peck, Bull. Buffalo Soc. Nat. Sci. 1: 46. 1873.

Described from specimens collected on the ground in woods at Croghan, New York. Not distinct from *C. inversa*.

CLITOCYBE SUDORIFICA Peck, Bull. N. Y. State Mus. 157: 67.  
1912

*Clitocybe dealbata sudorifica* Peck, Bull. N. Y. State Mus. 150:  
43. 1911.

First described as a variety of *C. dealbata* from specimens collected in grassy ground at Saratoga, New York, by F. G. Howland. It has been collected in two or three other localities in Albany and Ontario Counties. Mr. Howland, Dr. Peck, and Dr. W. W. Ford all agreed that this mushroom was decidedly sudorific and unwholesome, differing decidedly in this respect from the reputation enjoyed by *C. dealbata*. I have examined the types, however, and can see no morphologic difference between the two plants. They both grow gregariously in exposed grassy places and the best observer could not tell them apart. See notes on *C. morbilifera* Peck.

**CLITOCYBE SULPHUREA** Peck, Ann. Rep. N. Y. State Mus. 41: 62. 1888

Described and known only from specimens collected on decaying wood of spruce and balsam fir on Wittenberg Mountain in the Catskills, New York. There are five rather young specimens on the type sheet at Albany. They appear to be related to *Corticinellus decorus*, but the surface is not squamulose.

**CLITOCYBE TRULLISATA** (Ellis) Sacc. Syll. Fung. 5: 195. 1887

*Agaricus (Clitocybe) trullisatus* Ellis, Bull. Torrey Club 5: 45. 1874.

Described from specimens collected in an old sandy field at Newfield, New Jersey, and later reported in sandy soil in Suffolk, Nassau, Madison, and Albany Counties, New York. Peck remarks that the species resembles larger forms of *Laccaria laccata*, but it has a stouter habit, the pileus is more squamulose, the stipe is bulbous, the mycelium violet-colored, and the spores oblong. The spores are described as oblong or cylindric, smooth, granular within,  $15-20 \times 8-9 \mu$ .

**Clitocybe tenebricosa** sp. nov.

Pileus convex, becoming depressed at the center with the margin upturned, gregarious, reaching 6 cm. broad; surface smooth, white, glabrous; context white, rather thin, without characteristic odor; lamellae crowded, somewhat ventricose,

short-decurrent, inserted, white; spores globose, smooth, hyaline,  $4-6\ \mu$ ; stipe subfusiform, hollow, smooth, white, glabrous, reaching 12 cm. long and 2 cm. thick. (*pl. 165*).

Type collected September 25, 1908, by George H. Plass on the side of a trench under the museum building of the New York Botanical Garden, growing out between brickwork in total darkness, evidently arising from soil, as no wood was present. This species suggests one found by Miss Banning growing in cluster on a brick wall in a cellar at Baltimore, Maryland, and named by her *Agaricus (Tricholoma) cellaris*, but I believe the description was never published. The spores of Miss Banning's plant seem quite different from those of the species described above.

**CLITOCYBE TRUNCICOLA** (Peck) Sacc. Syll. Fung. 5: 184. 1887  
*Agaricus (Clitocybe) truncicola* Peck, Bull. Buffalo Soc. Nat. Sci. 1: 46. 1873.

Described from Croghan, New York, and said to be rare except in the Adirondack Mountains, occurring on the trunks of deciduous trees, especially those of the sugar maple.

**CLITOCYBE VILESCENS** (Peck) Sacc. Syll. Fung. 5: 184. 1887  
*Agaricus (Clitocybe) vilesens* Peck, Ann. Rep. N. Y. State Mus. 33: 19. 1883.

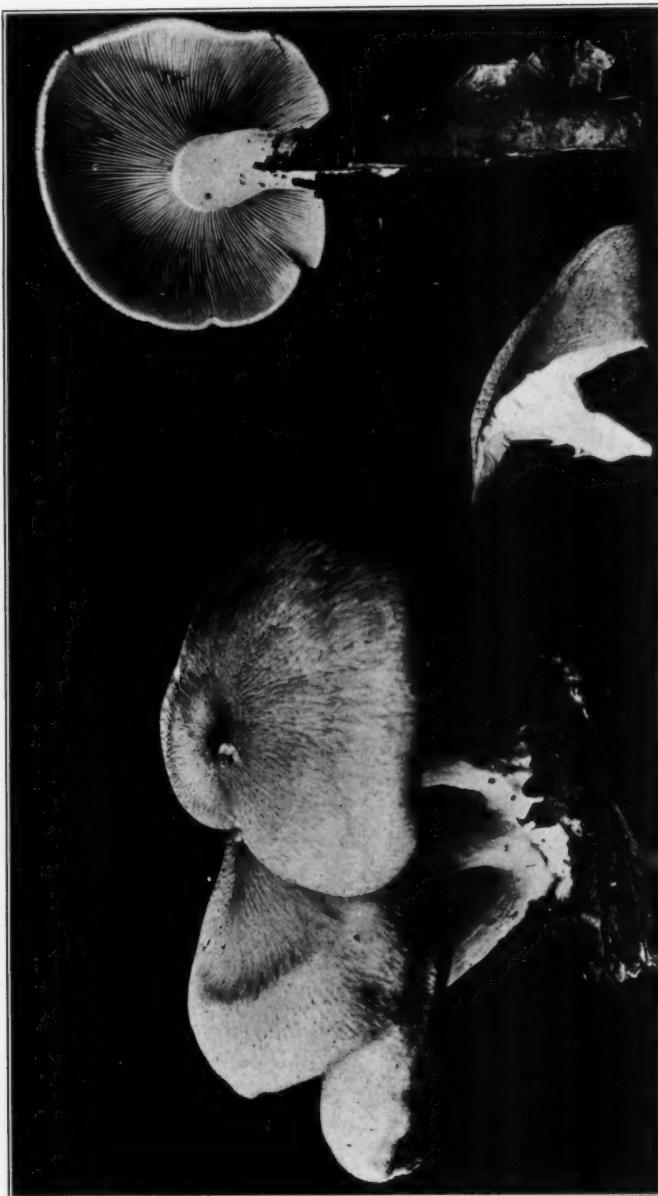
Described from specimens collected in grassy pastures at Jamestown, New York, and reported later as occurring rarely in bushy places and pastures in Albany and Onondaga Counties. In describing a pale form occurring in the sand, Peck states that the flavor is mild and agreeable.

**CLITOCYBE VIRENS** (Scop.) Sacc. Syll. Fung. 5: 152. 1887  
*Agaricus virens* Scop. Fl. Carn. ed. 2. 2: 437. 1772.  
*Agaricus odoratus* Bull. Herb. Fr. pl. 176. 1783.  
*Agaricus viridis* Huds. Fl. Angl. ed. 2. 1: 614. 1778.  
*Agaricus (Clitocybe) anisarius* Peck, Ann. Rep. N. Y. State Mus. 32: 26. 1879.

Described from Carniola and found commonly in open woods and bushy places throughout Europe and in the eastern United



CLITOCYBE TENEBRICOSA MURRILL



CLITOCYBE VIRENS (SCOP.) SACC.

States from Maine to North Carolina and west to Michigan. *C. odora* and *C. virens* are still kept distinct at Paris, probably following the opinion of Fries, but in England and America the two are considered synonyms. The specimens, descriptions, and illustrations everywhere agree, so far as I have examined them. The plant appears each season in the New York Botanical Garden among dead leaves in the edges of deciduous woods. Owing to its brilliant coloring and agreeable odor, it is decidedly attractive when young and fresh, but it is apt to fade with age and become confused with other species. (*pl. 166*).

COLLYBIA AQUOSA ADNATIFOLIA Bull. N. Y. State Mus. 2: 25.  
1887

Peck states in his 49th report that this variety is probably a *Clitocybe*.

TRICHOLOMA CELLARE Banning & Peck; Peck, Ann. Rep. N. Y.  
State Mus. 44: 179 (67). 1891

This name was published by Peck without description or comment, although Miss Banning's manuscript drawing and notes are quite complete. The lamellae being decurrent, the plant is a *Clitocybe*; or, if it grows on wood, a *Monadelphus*.

TRICHOLOMA SIENNA (Peck) Sacc. Syll. Fung. 5: 137. 1887  
*Agaricus (Tricholoma) Sienna* Peck, Ann. Rep. N. Y. State  
Mus. 24: 60. 1872.

Described from specimens collected on the ground in woods at Greig, New York, and apparently not reported since. A good drawing accompanies the types at Albany, and there is little doubt that this species is only a rather large form of *Clitocybe sinopica*.

#### WESTERN SPECIES OF CLITOCYBE

The genus *Clitocybe* is abundantly represented on the Pacific coast, where the author in 1911 discovered many novelties. The following 21 new species from Washington, Oregon, and Cali-

fornia were published in *Mycologia* for July, 1913: *Clitocybe albicastanea*, *C. albiformis*, *C. atrialba*, *C. avellaneialba*, *C. brunnescens*, *C. cuticolor*, *C. griseifolia*, *C. Harperi*, *C. hondensis*, *C. murinifolia*, *C. oculata*, *C. oreades*, *C. oregonensis*, *C. Peckii*, *C. stipitata*, *C. subcandicans*, *C. subinversa*, *C. subfumosipes*, *C. variabilis*, *C. violaceifolia*, and *C. washingtonensis*.

A number of additional interesting specimens have only recently been sent in from the Pacific coast, which indicates that the field is by no means exhausted.

**CLITOCYBE CLAVIPES** (Pers.) Quél. Champ. Jura Vosg. 48. 1872

An excellent specimen of this species was sent me in November, 1913, by Dr. H. D. House from Marshfield, Oregon. It was collected in fir woods in that locality by Mr. W. Haydon and marked number 21.

**CLITOCYBE DICOLOR** (Pers.) Murrill, Mycologia 7: 260. 1915

This species was collected by Macoun on St. Paul Island, Bering Sea.

**CLITOCYBE DEALBATA** (Sow.) Gill. Champ. Fr. 152. 1874

This species is common in grassy places and seems to be about the same as in the eastern United States, only a little larger and with the lamellae usually somewhat more distant. It was sometimes found growing in rings.

Seattle, Washington, *Murrill* 402, 513; Tacoma Prairies, Washington, *Murrill* 710; Corvallis, Oregon, *Murrill* 953, 1003; Newport, Oregon, *Murrill* 1045; Berkeley, California, *Yates* 84, 60; Golden Gate Park, California, *Murrill* 1115; Marin County, California, *Alice Eastwood* 35; Presidio, California, *Harper* 65; Stanford University, California, *Dudley* 188, 322, *McMurphy* 159.

**CLITOCYBE INVERSA** (Scop.) Quél. Champ. Jura Vosg. 214. 1872

This species is very abundant in Washington and Oregon, occurring especially in coniferous woods. In one locality near Seattle, I found seventy plants growing in a perfect ring six feet

in diameter. The hymenophore is very variable in color, ranging from pale-yellow to orange; the taste is astringent and unpleasant at first, soon becoming nutty and less unpleasant, though the astringent effects remain.

Seattle, Washington, *Murrill* 382, 390, 406, 408, 458, 613, 668, *Zeller* 24; Newport, Oregon, *Murrill* 1072, 1091; Salem, Oregon, *M. E. Peck*; Seaside, Oregon, *House* 12.92; Portola, California, *McMurphy* 50.

**CLITOCYBE MICROSPORA** Peck, Bull. Torrey Club 36:331. 1909

Described from specimens collected by C. F. Baker at Claremont, California, in January. Peck says it is related to *C. eccentrica*, but is larger, with less crowded lamellae, hollow stipe, smaller spores, and the pileus never umbilicate.

**CLITOCYBE PUSILLA** Peck, Bull. Torrey Club 22: 199. 1895

Known only from specimens collected by McClatchie on manure at Pasadena, California, February 15, 1895. The type, or at least a portion of it, is in McClatchie's herbarium at the New York Botanical Garden, numbered 879.

**CLITOCYBE SINOPICA** (Fries) P. Karst. Bidr. Finl. Nat. Folk  
32: 73. 1879

I found this species both in woods and in open fields. Its farinaceous odor was very distinct. The colors of the pileus and stipe were found to vary considerably.

Seattle, Washington, *Murrill* 300b, 302, 312, 441, 509, 555, 639; Corvallis, Oregon, *Murrill* 947; Calaveras Grove, California, *Hutchings* 197.

**CLITOCYBE SUBSOCIALIS** Peck, Bull. Torrey Club 23:411. 1896

Described from specimens collected by Yeomans on grassy ground at Camas, Washington, in December. Peck remarks that it is closely related to *C. socialis*, but differs in its strong odor, squamulose pileus, and white lamellae. The types at Albany very much resemble *C. sinopica*, but Peck says they differ from this species in their squamulose surface, although resembling it in color.

## TROPICAL SPECIES OF CLITOCYBE

Six new species of *Clitocybe* from tropical North America were described in *Mycologia* for July, 1911. The list includes *Clitocybe Broadwayi*, from Grenada; *C. incrustata*, from Chester Vale, Jamaica; *C. mexicana*, from Jalapa, Mexico; *C. niveicolor*, from Motzorongo, Mexico; *C. testaceoflava*, from Cinchona, Jamaica; and *C. troyana*, from Troy and Tyre, Jamaica.

*Clitocybe rivulosa* (Pers.) Quél. was reported from the West Indies by Fries, but no specimens from tropical America have been found in any of the European herbaria. *Clitocybe rubrotincta* (Berk. & Curt.) Sacc., described from Cuba, is probably referable to *Mycena*. There is a large, thick plant at Kew from Cuba bearing the name *Agaricus (Clitocybe) pachylus* Berk. & Curt., which is probably undescribed.

## EUROPEAN SPECIES REPORTED IN AMERICA

*Clitocybe aggregata* (Schaeff.) Gill. Reported from Rhode Island by Bennett.  
*Clitocybe angustissima* (Lasch) Gill. Reported by Peck as rare in New York.  
*Clitocybe candida* Bres. Reported from New York but doubtless confused with *C. robusta* Peck.  
*Clitocybe cerussata* (Fries) Quél. Reported by Peck as occurring rarely in the Adirondacks, as well as in certain other localities in America.  
*Clitocybe diformis* (Schum.) Gill. Reported once from New York by Peck. It has usually been regarded as a form of *C. cerussata*.  
*Clitocybe ditopoda* (Fries) Gill. Reported by Peck as rare in New York.  
*Clitocybe ectypa* (Fries) Gill. Reported from Alabama by Atkinson.  
*Clitocybe elixa* (Sow.) P. Karst. Reported from Massachusetts and Rhode Island.  
*Clitocybe fragrans* (Sow.) Quél. Reported by Peck as rare in New York. Also reported from North Carolina and California.  
*Clitocybe geotropa* (Bull.) Quél. Reported from Massachusetts, Wisconsin, and California.  
*Clitocybe hirneola* (Fries) Quél. Peck reports it once from New York.  
*Clitocybe inornata* (Sow.) Gill.  
*Clitocybe obbata* (Fries) Quél.  
*Clitocybe opaca* (With.) Gill. Reported from North Carolina by Curtis.  
*Clitocybe parilis* (Fries) Gill. Reported from North Carolina.  
*Clitocybe pruinosa* (Lasch) Quél. Reported from Ohio by Lea.  
*Clitocybe subinvoluta* (Batsch) Sacc. Reported from Massachusetts by Frost and from New York by Peck.  
*Clitocybe trullaeformis* (Fries) P. Karst. Reported from California by Harkness.  
*Clitocybe tuba* (Fries) Gill. Reported by Peck as rare in New York, but his specimens are quite different from European ones.  
*Clitocybe tumulosa* (Kalchbr.) Sacc. Reported from New York once by Peck.

## NORTH AMERICAN SPECIES OF MONADELPHUS

MONADELPHUS CAESPITOSUS (Berk.) Murrill, Mycologia 3:192.  
1911

*Lentinus caespitosus* Berk. Lond. Jour. Bot. 6:317. 1847.

*Agaricus (Pleurotus) caespitosus* Berk. Jour. Linn. Soc. 10:287.  
1868.

*Agaricus monadelphus* Morgan, Jour. Cinc. Soc. Nat. Hist. 6:69.  
1883.

*Clitocybe monadelpha* Sacc. Syll. Fung. 5:164. 1887.

*Pleurotus caespitosus* Sacc. Syll. Fung. 5:352. 1887.

*Clitocybe aquatica* Banning & Peck; Peck, Ann. Rep. N. Y. State  
Mus. 44:180 (68). 1891.

*Armillaria mellea exannulata* Peck, Ann. Rep. N. Y. State Mus.  
46:134 (54). 1893.

*Clitocybe parasitica* Wilcox, Okla. Agric. Exper. Sta. Bull. 49:  
18. 1901.

This species has been much discussed both in America and Europe, some claiming that it is distinct and others that it is only a variety of *Armillaria mellea*. Bresadola says it is the same as *Agaricus tabescens* Scop., figures of which appear to be darker throughout than our plant, although very similar. Peck says it differs from *Armillaria mellea* in its decidedly decurrent lamellae, solid stipe, more agreeable flavor, and the absence of an annulus. Both Curtis and Peck considered it edible, but Sterling said it made him very ill on three different occasions and was a dangerous species. It occurs in dense clusters about old stumps from New York to Kansas and south to Alabama and British Honduras, being more common in the southern United States. Specimens at Kew from Cuba bearing this name are entirely distinct.

MONADELPHUS ILLUDENS (Schw.) Earle, Bull. N. Y. Bot. Gard.  
5:432. 1909

*Agaricus illudens* Schw. Schr. Nat. Ges. Leipzig 1:81. 1822.

*Agaricus (Pleurotus) facifer* Berk. & Curt. Ann. Mag. Nat.  
Hist. II. 12:421. 1853.

*Clitocybe illudens* Sacc. Syll. Fung. 5:162. 1887.

This large and brilliantly colored poisonous species occurs rather commonly in the eastern United States westward to Kansas and Texas in large clusters about stumps and dying trunks of oak and other deciduous trees, and rarely about pine stumps. For a description, illustration, and notes on its poisonous and luminescent properties, see recent numbers of *Mycologia*.

Bresadola considers *Pleurotus olearius*, which occurs on the olive in southern Europe and has been reported by Maire on pine, the same as this species. If this is true, I should be inclined to regard *Pleurotus lampas*, *Pleurotus noctilucens*, and *Panus incandescens* as also forms of the same widely distributed, highly phosphorescent plant.

**Monadelphus marginatus** (Peck) comb. nov.

*Clitocybe marginata* Peck; V. S. White, Bull. Torrey Club **29**: 558. 1902.

Described from specimens found growing in clusters about a decaying stump at Mt. Desert, Maine, in September. There is one plant at Albany and it appears quite distinct. The description, including spore measurements, reminds one of *M. illudens*, with the exception of the color, which is bay-red verging to mahogany. Miss White made an excellent colored sketch of the plant, with notes, which she deposited at the New York Botanical Garden.

**Monadelphus revolutus** (Peck) comb. nov.

*Clitocybe revoluta* Peck, Ann. Rep. N. Y. State Mus. **46**: 103 (23). 1893.

Collected once on buried wood in woods at Alcove, New York, and distributed by Shear. It is densely cespitose, with whitish surface and very crowded, narrow, adnate or slightly decurrent lamellae.

**Monadelphus sphaerosporus** (Peck) comb. nov.

*Clitocybe sphaerospora* Peck, Bull. Torrey Club **36**: 331. 1909.

Described from specimens collected under oaks at Claremont, California, in January. The species greatly resembles *M. illudens*,

but the spores are about twice as large. It also occurs on eucalyptus.

Sequoia Canyon, Marin County, California, *Alice Eastwood* 30; Stanford University, California, *Dudley* 157, *Miss A. M. Patterson* 12; Santa Barbara, California, *O. M. Oleson* 51, 127.

NEW YORK BOTANICAL GARDEN.

## PENICILLIUM AVELLANEUM, A NEW ASCUS-PRODUCING SPECIES<sup>1</sup>

CHARLES THOM AND G. W. TURESSON

Ascus production by species of *Penicillium* is not common. The observations of certain species by Brefeld,<sup>2</sup> Morini<sup>3</sup> and Westling<sup>4</sup> have never been repeated by other workers, some of whom have watched thousands of cultures in the hope of finding one of these forms. On the other hand, *P. luteum* Zukal<sup>5</sup> is a member of a widely distributed group,<sup>6</sup> some members of which have been found repeatedly, while the ascus-producing form is not uncommon. Ascus production in this species is not dependent upon special methods of culture. Another species has now been found by one of us (Turesson) in cultures from the faeces of a bear in the Zoological Garden, at Seattle, Washington. In this form as in *P. luteum*, the asci are produced in almost all of the media regularly used. The time required varies from six weeks to perhaps three months. Its morphology relates it to *P. luteum* and to the ascus-producing forms of *Aspergillus*.

**Penicillium avellaneum** sp. nov. Thom & Turesson. Colonies upon Czapek's solution agar, broadly spreading, slightly floccose, in conidial areas becoming persistently avellaneous (Ridgway XL, 17' ' 6), producing perithecia slowly during a period of several weeks with the gradual development of aerial hyphae colored Indian-red in the perithecial areas; reverse and agar becoming Indian-red (Ridgway XXVII, 3' K); conidiophores up to 400  $\mu$  long by 3 to 5  $\mu$  in diameter, bearing conidial fructifications up to

<sup>1</sup> Published by permission of the Secretary of Agriculture.

<sup>2</sup> Brefeld, O. Bot. Unters, über Schimmelpilze, Heft 2. 1874.

<sup>3</sup> Morini, Fausto. Sulla forma ascofora de Penicillium candidum, Link. Malpighia, anno 2, fascicule 5/6 pp. 224-234. Messina, 1888.

<sup>4</sup> Westling, R. Svensk Botanisk Tidskrift, Bd. 4 (1910), Heft 2, pp. 139-144.

<sup>5</sup> Zukal, Sitz. d. Kais. Akad. d. Wissensch. in Wien, Math. Naturw. Cl., XC VIII, p. 561, 1891.

<sup>6</sup> Thom, C. The *Penicillium luteum*-*purpurogenum* group. MYCOLOGIA, Vol. VII (1915), no. 3, pp. 134-142.

200  $\mu$  long, composed of loosely parallel or tangled chains of conidia; fertile branches either a terminal crowded verticil of metulae 8–10 by 3  $\mu$  bearing verticils of few sterigmata 8–9  $\times$  2  $\mu$ , or with branches more or less irregularly disposed over the terminal 10–15  $\mu$  of the conidiophore; conidia ellipsoid to almost globose, 2–2.5  $\times$  3–3.5  $\mu$ , smooth, swelling in germination to 5  $\mu$  in diameter and producing a single tube.

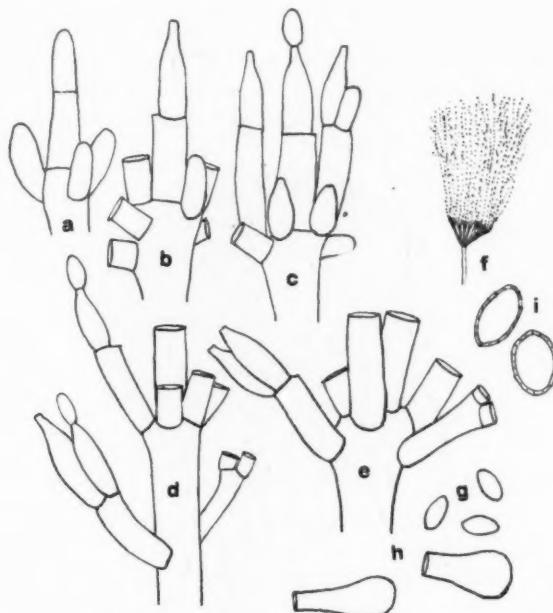


FIG. 1. *a, b, c*, Young conidial apparatus showing variation in branching; *d*, an occasional case of superposed verticils; *e*, a typical single verticillate fruit; *f*, diagrammatic representation of whole conidial fructification; *g*, conidia; *h*, conidia swollen and each producing one germ tube; *i*, ascospores with thick walls apparently fitted; magnification *a, b, c, d, e, g, h, i*,  $\times 900$ ; *f*,  $\times 260$ .

Perithecia ellipsoid to globose 300–600  $\mu$  in diameter, originating as an ascigerous mass surrounded by numerous swollen, very thick-walled cells, with the slow development of a peridium composed of thick-walled cells, 8–12  $\mu$  in diameter in one or sometimes two layers; asci 9–10  $\times$  12–15  $\mu$ , 6–8-spored; ascospores ellipsoid, 4–5  $\times$  6.5–8.5  $\mu$ , with walls thick, pitted or with the appearance of round, transparent spots.

## CULTURAL DATA

*Potato agar*, good growth, characteristic spreading pink-yellowish colonies.

*Potato plugs*, rapid and vigorous growth of almost colorless mycelium.

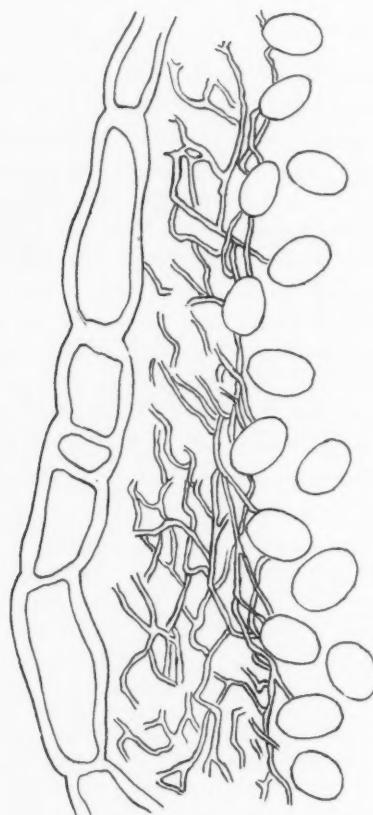


FIG. 2. Wall of perithecium.

*Bean agar*, feeble growth, floccose yellowish mycelium.

*Czapek's solution agar* (no nitrogen added), solidified with agar; carbon supplied as:

*Cane Sugar*, good growth up to 50 per cent. In 60 per cent. feeble, slowly reaching normal proportions.

*Galactose 3 per cent.*, vigorous growth of characteristic colonies.

*Lactose 3 per cent.*, as in galactose, *Levulose 3 per cent.* not vigorous.

*Glycerin 3 per cent.*, fairly good growth; *potato starch*, fair growth.

*Butterfat*, growth slow; *lactic acid 0.9 per cent.* poor growth.

*Fifteen per cent. gelatine in water*, good growth, liquefaction beginning within 48 hours at 37° C.; at 27° C. within 3 days, at room temperature after 5 or 6 days.

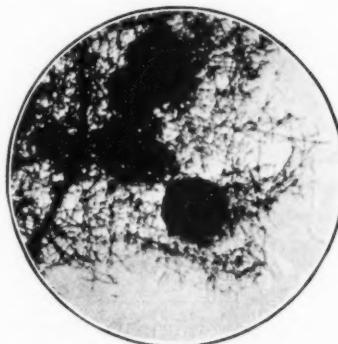


FIG. 3. Microphotograph of perithecia by J. Westerberg.

*Milk*, good growth; curdling beginning on the third day at 37° C.; on the fourth day at 27° C.; on the sixth or seventh at room temperature.

*Pigment formation* in cultures kept at 27° C. begun on the seventh day in *butterfat* and *potato starch*, slight in the other media. None in *bean agar* at the end of six weeks. At room temperature coloration begun on the tenth day, maximum in *butterfat*; none in *bean agar* at the end of six weeks.

Slow growth at room temperature; fairly good at 27° C.; optimum at 36–38° C.; germination and growth feeble at 42° C.

## NEWS AND NOTES

Professor W. C. Coker, of the University of North Carolina, spent several days at the Garden early in August consulting the mycological herbarium and library in preparation of a work on the more conspicuous fungi occurring in the vicinity of Chapel Hill, North Carolina.

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Mr. Percy Wilson spent the month of July at Arkville, New York, and obtained a number of interesting specimens of fungi. Arkville is one of the most northerly stations in the local flora range.

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Professor H. S. Jackson, formerly head of the department of botany and plant pathology of the Oregon Agricultural College, has recently been appointed chief in botany at the Agricultural Experiment Station, Purdue University, Lafayette, Indiana. Professor Jackson entered upon his new duties at Lafayette on September 1, 1915.

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Dr. Lewis Sherman, president of the Wisconsin Mycological Society, died on July 2 from heart disease which developed during the winter. He was not only an enthusiastic and painstaking mycologist, but also had a good general knowledge of botany and knew intimately most of the plants of his region. Mr. Julius Bleyer, assistant editor of "The Evening Wisconsin," succeeds Dr. Sherman as president of the Wisconsin Mycological Society.

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*Rheosporangium aphanidermatum*, a new species and new genus belonging to the Saprolegniaceae, is described by H. A. Edson in the *Journal of Agricultural Research* for July. The fungus is a parasite causing damping off of the seedlings of sugar beets and black rot of radish.

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The chestnut canker has been discovered on freshly fallen chestnuts by J. Franklin Collins, who gives a brief account of his dis-

covery and subsequent confirmatory experiments in *Phytopathology* for August, 1915. It is hardly necessary to suggest that this has an important bearing on the introduction of the disease into far distant localities.

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A large collection of tough and woody fungi was made in the hammocks of southern Florida by Dr. J. K. Small, Head Curator, during February and March, 1915, including two tropical species new to the United States and two Gulf Coast species new to the subtropical part of Florida. *Favolus variegatus*, locally known as "spirit-cups," was found to occur in great abundance, often reaching a foot in diameter.

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Twenty-three new species and several new varieties of fungi from North America are described by P. A. Saccardo in a recent number of *Annales Mycologici*. The fungi listed in the article, of which there are eighty-eight in all from North America, were collected in New York by H. D. House, in Canada by John Dearness, and in North Dakota by J. F. Brenckle.

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A memoir of the Torrey Botanical Club issued in June, 1915, consists of a monograph by A. H. Chivers of the genera *Chaetomium* and *Ascotricha*. Twenty-eight species of *Chaetomium*, two of which are new, and two species of *Ascotricha* are described. The memoir contains ninety-five pages of text and is illustrated by seventeen heliotype plates. All of the species are illustrated and the drawings, made by the author, are excellent. The work is a most valuable one for all students of ascomycetes.

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A recent paper by J. R. Weir in the *Journal of Agricultural Research* deals with the possible economic importance of *Wallerothiella Arceuthobii*, a fungus which is parasitic on false mistletoe. The fungus has not previously been well known, having been reported only twice and from widely separated localities. The presence of the fungus prevents the maturing of the seeds of the host and in this way tends to retard the mistletoe, which is very destructive to the conifers in the West.

The present season has been exceptionally early and good for fungi of all kinds, owing to the fact that the frost was out of the ground much earlier than usual and the rains have been heavy and frequent. Work on the local fungi by Dr. Murrill has been continuous and many interesting forms, some of them new, have been collected, described, and figured. Dr. Seaver has not only obtained many interesting discomycetes in the vicinity of New York City, but has spent several weeks collecting about Portland, Connecticut.

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#### A NEW MEPHITIC CLAUDOPUS

##### **Claudopus mephiticus** sp. nov.

Pileus eccentric, convex to nearly plane, somewhat depressed at the center, cespitose, 2.5-5 cm. broad; surface dry, glabrous, slightly concentrically sulcate, greenish-white when young, dull-white or yellowish-white when old, margin concolorous, undulate; context white, with a very decided mephitic or garlic odor and taste; lamellae sinuate, subdistant, broad, slightly serrate on the edges, white, becoming rose-colored at maturity; spores angular, rose-colored, uniguttulate,  $9 \times 7 \mu$ ; stipe short, subcylindric, very eccentric, solid, pruinose, white, 1-1.5 cm. long, 4-6 mm. thick.

Type collected on fallen dead branches in Minnehaha Park, Minneapolis, Minnesota, July 30, 1915, by Mrs. M. W. Smith. Complete descriptive notes were made from the fresh specimens by Dr. Mary S. Whetstone, who sent me a copy of them with some of the specimens under her accession number 60. The species seems nearest to *Claudopus depluens*, but is much larger and has a very decided mephitic or garlic odor both in the fresh and dried state. *Claudopus nidulans* is said to have a similar odor, but it must be much less decided and, furthermore, the additional charm of conspicuously angled spores is entirely lacking.

W. A. MURRILL.

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#### NOTES ON AGARICUS RETICEPS Mont.

An excellent specimen of this plant was sent me in July, 1914, by the late Dr. Lewis Sherman, of Milwaukee, Wisconsin, and I was able to make a careful study of it before it had entirely dried.

The previous summer, I had examined Montagne's type at Paris from Columbus, Ohio, and compared it with specimens sent me by Dr. Mary Whetstone from Minneapolis, Minnesota, and by Dr. Bruce Fink from Oxford, Ohio. The specimens at Albany have also been examined. *Panus meruliiceps* Peck was described from specimens collected by Dr. Glatfelter on trunks of elm trees at St. Louis, Missouri. The original specimens of *Agaricus reticulatus* Johnson, collected on Nicollet Island, Michigan, are lost, but his description clearly refers to the plant under discussion.

The plant occurs sparingly on fallen dead deciduous trunks, especially of elm, in Ohio, Illinois, Kansas, Missouri, Wisconsin, Minnesota, and Michigan; and possibly also in parts of Europe. *Collybia retigera* Bres. is also beautifully reticulate, but is quite distinct.

The proper relationship of this species has been a matter of considerable doubt, as is evidenced by the fact that it has figured in several different genera. The spores are rough but not angular, hyaline, slightly yellowish in mass, assuming a pale-rosy tint on exposure, reminding one of some species of *Pleurotus*. The context is too tough for *Pleurotus*, *Tricholoma*, or *Clitocybe*, or even for *Collybia*, hence *Lentinula* is probably the best place for it, although the species is aberrant in several particulars.

***Lentinula reticeps* (Mont.) comb. nov.**

*Agaricus (Clitocybe) reticeps* Mont. Syll. Crypt. 101. 1856.

*Agaricus (Tricholoma) reticulatus* Johnson, Bull. Minn. Acad. 1: 354. 1880.

*Agaricus alveolatus* Cragin, Jour. Myc. 1: 28. 1885.

*Pluteus alveolatus* Sacc. Syll. Fung. 5: 679. 1887.

*Panus meruliiceps* Peck, Bull. Torrey Club 32: 78. 1905.

Pileus fleshy-tough with the cuticle somewhat gelatinous, firm, convex or depressed, cespitose, 3 cm. or more broad; surface glabrous, sometimes viscid, rarely smooth, usually beautifully reticulate with elevated, anastamosing ridges, salmon-colored or pale-brick-red tinged with yellow in the center, margin involute; context pinkish, without characteristic odor, but with a sweetish taste; lamellae fleshy-tough, salmon-colored, adnate or slightly decur-

rent with a tooth, rounded behind, the bases slightly connected, close, narrow; spores globose, echinulate-tuberculate, hyaline,  $5-7\ \mu$ ; stipe tough, glabrous, white to pallid, ochroleucous below, blackish at the base, grooved, central or eccentric, curved, solid, fibrous, 2.5-4 cm. long, 5-12 mm. thick.

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